

Vomiting Cats: What's Next?

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Vomiting is a common and frequently complex problem in cats. Adult cats often have different and more chronic causes of vomiting than kittens, but the condition remains a common reason for cats to be presented to veterinarians for care. Vomiting can be caused by both primary gastrointestinal diseases (e.g. infectious, inflammatory, parasitic, anatomic (obstructive, trichobezoars), drug-related or nutritional) and by extra-gastrointestinal (GI) diseases, such as endocrinopathies (e.g. hyperthyroidism), metabolic disease (e.g. renal failure), inflammatory or other liver diseases, pancreatitis, and neoplasia (especially alimentary lymphoma). This wide spectrum of potential causes of vomiting in cats increases the difficulty for the practitioner in making a definitive diagnosis. Nevertheless, it is important to carefully consider each of the potential differentials to prevent the problem from progressing to create further clinical deterioration.

Extra-Gastrointestinal Causes of Vomiting

One of the first steps in evaluating a vomiting cat is to attempt to determine as quickly as possible, whether the vomiting is due to a primary gastrointestinal problem (e.g. gastritis, IBD, etc), or caused by a disease outside of the gastrointestinal tract (e.g. liver or renal disease, pancreatitis, endocrinopathies, heartworm, etc). In many cases of vomiting due to gastrointestinal disease, the diagnosis is made by imaging, evaluation of tests of GI function, or biopsy of the GI tract. However, in extra-GI causes of vomiting, laboratory tests are more important to determining the cause of the problem (e.g. thyroxine levels for hyperthyroidism, chemistry panel for renal or liver disease, etc). The best way to help point the clinician toward the proper diagnostic approach is to obtain a thorough history of the problem and perform a complete physical examination. These tools of the medical trade are often underestimated in their importance, but can be invaluable to the clinician in helping to refine and focus the diagnostic approach.

Feline Pancreatitis

Feline pancreatitis is a very difficult disease to definitively diagnose antemortem (especially chronic cases or in cats that only vomit occasionally or intermittently). This partly due to the lack of specific clinical signs in cats, as well as the lack of a rapidly available test for diagnosis of the disease. In cats with chronic pancreatitis, the available tests are even less sensitive and specific, thus diagnosis is even more very difficult.

The clinical signs of feline pancreatitis can be quite different from those in dogs. Acute pancreatitis is frequently encountered in obese dogs fed a high fat diet, while cats are more likely to be underweight, and high fat diets do not appear to be an important predisposing factor. Cats of all ages, sexes and breeds are affected, although Siamese cats are reported to have pancreatitis more frequently. Finally the clinical signs of pancreatitis in cats are very vague,

with the most common signs being lethargy (reported in 100% of cats in one study), anorexia, dehydration and abnormal body temperature (either fever or hypothermia can be observed). Thus, the clinical signs may be quite variable, and this must be taken into consideration with each patient.

The fTLI was developed many years ago as the definitive test for diagnosis of exocrine pancreatic insufficiency, and the data and follow up have confirmed its utility for this condition. In recent years, others have evaluated the fTLI as a diagnostic test for acute pancreatitis – working on the premise that an elevation in serum concentrations were consistent with pancreatic leakage or inflammation. While an increase in fTLI can be found in cats with acute pancreatitis, a normal fTLI does not rule out pancreatitis. This is because the leakage of enzymes tends to decrease rapidly following an event, or the enzymes are inactivated and scavenged by the body's peptidases (macroglobulin, etc) within 12-24 hours following an acute insult. Further, in chronic or low grade pancreatitis, the leakage is not great enough to be detected by this assay. Thus, while an increase in fTLI is specific for pancreatic enzyme leakage, it is not sensitive enough to be a definitive test for pancreatitis. More recently, an ELISA for pancreatic specific lipase (feline pancreatic lipase immunoreactivity –fPLI) was developed by the GI lab at Texas A&M University. The assay is species specific, has been used to detect elevations in pancreatic lipase in clinical cases, and appeared to be more specific and sensitive for diagnosis of pancreatitis in cats than fTLI. However, the assay had a relatively low sensitivity (33%) and specificity (<80%) when a cut off value of 100 ug/L was used for diagnosis. To improve upon this assay, a radioimmunoassay (RIA) was developed and validated in 30 healthy cats. In a recent paper, the sensitivity and specificity of this assay was tested in cats with mild pancreatitis and in cats with moderate to severe pancreatitis. The sensitivity in mild pancreatitis was found to be 80% while the specificity in healthy cats 75%. However, in severe pancreatitis (determined by pancreatic biopsy) the sensitivity and specificity were both 100%. These findings underscore the utility of this test in cats with acute pancreatitis, however, there still is a problem with detection of low grade or chronic pancreatic inflammation in cats with this assay. In cats with chronic pancreatitis it will still be necessary to evaluate the combined historical, physical exam, lab data and imaging information along with the fPLI when making a diagnosis.

Imaging studies are frequently used to help identify cats with acute pancreatitis, however, the changes are not consistent and can be particularly subject to interpretation and operator expertise. The most common radiographic abnormalities include a generalized or focal (upper right quadrant) loss of peritoneal detail (suggesting peritonitis or peritoneal effusion), presence of a mass in the area of the pancreas, hepatomegaly, dilated intestinal loops, or a fluid-filled duodenum. However, these findings are not specific for pancreatitis, and the sensitivity of radiography for diagnosing pancreatitis is low in cats. Ultrasonography may reveal a hypoechoic pancreas, hyperechoic

mesentery, a mass effect, a dilated common bile duct or it may be normal. In previous studies, the sensitivity of ultrasound for diagnosis of pancreatitis was reported to be 24%. In a recent study, mild pancreatitis was still shown to be difficult to diagnose via abdominal ultrasound. However, in that same study, ultrasound had an 80% sensitivity and 88% specificity in cats with moderate to severe pancreatitis. The most reliable method for making an accurate diagnosis of pancreatic disease remains direct visualization and histopathology. However, this can be expensive, increase the risk of complications (anesthesia/surgery), and in cases with focal lesions, which is common with chronic pancreatitis, the lesions may be missed on visual or histopathologic inspection.

Feline Cholangitis

Diseases affecting the liver are a common clinical problem in cats. There are four major types of liver disease in cats: hepatic lipidosis, cholangiohepatitis complex, infectious hepatitis (e.g. FIP), and neoplastic liver disease (e.g. lymphoma). As with all diseases of the liver, histopathology is required for a definitive diagnosis, and this is the most important step in determining treatment and prognosis. Nevertheless, once a diagnosis is obtained, the goal for treatment of cats with severe liver disease is to provide optimal nutritional and pharmacologic support to maximize liver function, minimize future liver damage or scarring, and to control the concurrent clinical signs such as vomiting, to promote a high quality of life. The interested reader is referred to the proceedings on cholangitis for more information.

Primary Gastrointestinal Causes of Vomiting Adverse Reactions to Food

Food sensitivity and food intolerance are the most common adverse reactions to food in cats. Food allergy or hypersensitivity is an adverse reaction to a food or food additive with a proven immunologic basis. Food intolerance is a non-immunologic, abnormal physiologic response to a food or food additive. Both can be responsible for diarrhea or vomiting, but vomiting is a more common presenting complaint. Food poisoning, food idiosyncrasy and pharmacologic reactions to foods also come under this category of adverse reactions to food. The specific food allergens that cause problems in cats have been poorly documented, with only 10 studies describing the clinical lesions associated with adverse food reactions. In these reports, over 80% of the reported cases were attributed to beef, dairy products or fish in cats. The incidence of food allergy versus food intolerance in cats is unknown. However, a recent study by Guilford, et al, suggested that 33% of cats with vomiting or other GI signs had food sensitivity. The diagnosis of both food sensitivity and intolerance is based upon a dietary elimination trial. The major difference between these two types of adverse food reactions is the length of time on the diet that is required to achieve a response (cats with food sensitivity require

6-12 weeks on the elimination diet before an improvement will be seen). Alternatively, in cats with food intolerance, resolution of signs usually occurs within days of the diet change (unless there is concurrent bacterial flora disruption or other factors influencing the response). There are a variety of commercially available and homemade elimination diets, as well as diets formulated with hydrolyzed proteins, that may be used in cats with suspected food sensitivity or intolerance. The key is to select a diet that has a novel or hydrolyzed protein source (based on a careful dietary history), that is balanced and nutritionally adequate (commercial diets are best for this), however, homemade elimination diets may be needed to find an appropriate test diet. If a homemade diet must be used for long term therapy, a complete and balanced diet containing the necessary protein sources should be formulated by a nutritionist. In most cats with food sensitivity, avoiding the offending food is the most effective therapy and will result in complete resolution of signs. However, short term steroid therapy can be used to decrease the concurrent intestinal inflammation until the appropriate food sources can be identified.

Finally, some cats with vomiting due to food related causes will respond to placing them on a high protein, low carbohydrate diet (canned growth or diabetic formula foods). The reason why kittens or cats respond to these diets is not completely known, but may be related to carbohydrate intolerance or to changes in the bacterial flora that result from some foods. While this hypothesis remains to be proven in cats, there is increasing anecdotal evidence that in cats with signs of GI disease such as vomiting, feeding a canned diet containing either highly digestible moderate carbohydrate or high protein and low carbohydrate content is beneficial. Obviously, dietary therapy is not the answer to effective control in all vomiting cats, but in many of these cats dietary therapy is an important component of therapy that should be carefully considered and implemented, and adjusted to meet the needs of the pet and its situation.

The use of diet to assist in the management of vomiting is not a new concept. Nevertheless, the type of diet used to help manage the problem has become an increasingly complex issue. In many, if not most cases of uncomplicated vomiting or vomiting due to food type, the best approach is to feed a highly digestible diet or change the diet to one with fewer additives, flavorings, or other substances than may be associated with food intolerance. These types of diets are designed to provide food that is easy to digest (moderate to low fat, moderate protein, moderate carbohydrate), may have additives to improve intestinal health (soluble fibers, omega 3 fatty acids, increased anti-oxidant vitamins, etc), and contain no gluten, lactose, food coloring, preservatives, etc. There are many different brands available that fall under the category "highly digestible", but, the key is to remember that they are not all alike. Thus, when one diet from this category not accepted by the cat, is ineffective, or seems to make the problem worse, you cannot assume that all diets in this category will be ineffective. The highly digestible diets from different

pet food manufacturers have a wide variety of different formulations: different protein and carbohydrate sources, different levels of fat, and a variety of additives designed to promote intestinal health (FOS, MOS, omega 3 fatty acids, antioxidant vitamins, soluble fiber, etc). If one type of highly digestible diet has been fed for at least 2 weeks with minimal response, then is it entirely reasonable to either try another diet from a different source, or try an entirely different dietary strategy (e.g. high protein/low carb, novel antigen, hydrolyzed, etc). Another consideration is that the cat may improve by taking into account the amount or type of food fed. For example, feeding a canned food diet may improve gastric emptying –especially if the vomiting is occurring immediately after eating. Alternatively, if canned food is not an option, feeding smaller meals more frequently, to reduce vomiting that occurs in cats with altered gastric motility or reflux. The key is to remember that dietary management is a trial and error process – there is no single diet that will benefit all cats in all situations.

Inflammatory or Immune-Mediated Causes of Vomiting

Inflammatory bowel disease (IBD) in cats is a commonly diagnosed condition of adult cats that may represent multiple etiologies. IBD is characterized by persistent clinical signs (vomiting, diarrhea or weight loss) consistent with GI disease that occur in the absence of an identifiable cause but also have histologic evidence of mucosal inflammation and structural changes. There are a number of possible causes of intestinal inflammation that must be considered in the diagnostic process, including infectious, food sensitivity/intolerance, hyperthyroidism, neoplastic or protozoal and parasitic. These should be investigated thoroughly or empirical therapy instituted prior to settling on the diagnosis of idiopathic IBD. Food sensitivity can be particularly difficult to distinguish from IBD or other intestinal disorders. In a recent study, food sensitivity was reportedly responsible for at least 30% of all feline gastrointestinal problems. Thus, appropriate food trials are an extremely important component of both diagnosis and therapy of cats with GI disease or suspected IBD. In addition to food trials, the diagnostic plan for a cat with chronic diarrhea should include multiple fecal examinations or therapeutic deworming, assessment of thyroid and FeLV/FIV status, and intestinal vitamin (cobalamin) status. Serum cobalamin levels in cats commonly decrease with severe distal bowel disease, and in cats with hypocobalaminemia, the diarrhea will not resolve until replacement therapy is instituted. Cobalamin therapy (250 ug/cat IM q week) in some cats may be lifelong, while in others, once the clinical disease resolves the supplementation can be discontinued. In addition, radiographs and ultrasound are important in assessment for the presence of infiltrative diseases such as FIP granulomas, histoplasmosis or lymphosarcoma. But, ultimately, intestinal biopsies, either obtained endoscopically or at an exploratory surgery are essential – both for the diagnosis of IBD and for ruling out other specific causes of the clinical signs. In humans, recent studies indicate a strong association of development of IBD with a breakdown of normal tolerance mechanisms, host susceptibility and the enteric microflora. It is quite

likely that these same factors are important in feline IBD, and in studies using experimental models of IBD, the resident microflora are essential cofactors in driving the inflammatory response. Further, modulation of the enteric microenvironment in humans with IBD has been shown to reduce proinflammatory cytokines in the mucosa and thus, decreases the inflammation. Unfortunately, accurate, readily accessible methods of assessing the bacterial numbers and species populating the small intestine are not yet available. In addition, studies in cats with IBD assessing modulation of the enteric flora (using probiotics, prebiotics, or other specific therapy for cytokines) are only in the early stages of study. At this time, therapy of IBD in cats continues to include inflammatory suppression and antibiotic therapy. The most effective therapies for IBD include steroids (prednisolone or methylprednisolone 1-2 mg/kg po q12h po) or other drugs that interrupt the pro-inflammatory pathways that are active in the gut. In cats that are intolerant of steroids, or in those in which steroids are no longer effective, immunosuppressive therapy may be necessary, and is often effective. Antibiotic therapy with metronidazole (5-10 mg/kg po q12h) or tylosin (5-15 mg/kg a12h) has been effectively used for control of bacterial associated disease and continues to be recommended for initial therapy of IBD. Whether or not this is due to the antibiotic effects of these drugs and their influence on the intestinal microflora, or due to their immune modulating activities is unknown, but nevertheless therapy with these drugs continues to be helpful. Caution is advised in using these drugs on a continuous or chronic basis, and if needed they should be used intermittently, not continuously. Finally, general agreement exists among gastroenterologists that elimination diets or novel protein, highly digestible diets are beneficial in cats with IBD. Nevertheless, agreement also exists that dietary management alone is seldom successful, thus control of the aberrant inflammatory process and bacterial components are still necessary. Further, at this point in our understanding, we still do not know which components of the diet (protein, carbohydrate, minerals, etc) are important in the pathogenesis or therapy of IBD, or if other aspects of nutritional support (fatty acids, probiotics or other nutraceutical therapy) may reduce the inflammatory response. There is increasing data in human IBD that probiotics and anti-oxidant, prebiotic nutraceuticals may be important components of therapy.

Non-specific Therapy of Vomiting

There are a number of anti-emetic agents available for use in cats that are vomiting. Some are more commonly used in the hospital setting because they are injectable and may require frequent administration. The α_2 adrenergic antagonists (phenothiazines) and 5-HT₃ antagonists (ondansetron) appear to be the most effective anti-emetic agents in the cat. Cats may be treated with chlorpromazine (α_2 adrenergic antagonist) at a dose of 0.2-0.4 mg/kg administered subcutaneously or intramuscularly every 8 hours, or with any of the 5-HT₃ antagonists (ondansetron 0.1-1.0 mg/kg, granisetron 0.1-0.5 mg/kg,

or dolasetron 0.5-1.0 mg/kg, orally or intravenously every 12-24 hours). Dopaminergic antagonists, e.g., metoclopramide, are less effective anti-emetic agents in the cat, and because they antagonize dopamine, may potentially reduce pancreatic blood flow (this effect has not been proven in cats with pancreatitis). However, this drug is available in an oral preparation that can be used for therapy at home. While nonspecific therapy may be indicated to control vomiting, it is important to remember that finding the cause of vomiting is important, rather than just controlling the clinical sign. Thus, antiemetic therapy should be used judiciously in the clinical setting and as an adjunct to therapy for the primary problem.

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