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 (GI) diseases (e.g., infectious, inflammatory, parasitic, anatomic [obstructive, trichobezoars], drug-related, or nutritional) and by extra-gastrointestinal 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.

Primary Gastrointestinal Causes of Vomiting

Adverse Reactions to Food: 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 that 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 is 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 it is 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.

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, the majority of 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, in two recent studies of cats with non-specific diarrhea, 2/3 of the cats improved with dietary therapy, suggesting that a large percentage of cats with diarrhea have some degree of food intolerance. The diagnosis of either food sensitivity or food 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 floral disruption or other factors influencing the response)—but within 10–14 days is a reasonable expectation. 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
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 (lymphoma), 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 percent 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 (especially lymphoma) 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 q12h) has been effectively used for control of bacterial associated disease and continues to be recommended for 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. Finally, general agreement exists among gastroenterologists that elimination/novel protein diets or highly

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 known, but may be related to carbohydrate intolerance or to changes in the bacterial flora that result from high starch 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.

Influenzal or Immune-Mediated Causes of Vomiting

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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 are increasing data in human IBD that probiotics and anti-oxidant, prebiotic nutraceuticals may be important components of therapy.

**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 Liver Diseases**

Diseases affecting the liver are a common clinical problem in cats. There are four major types of liver disease in cats: hepatic lipodosis (primary and secondary), cholangitis (acute or chronic forms), infectious hepatitis (e.g., FIP, toxo, histo, etc.), and neoplastic liver disease (e.g., lymphoma). The first step is to assess liver enzyme activity—especially since the half life of these enzymes in cats is much shorter, and because cats don’t have a steroid isoenzyme for alkaline phosphatase—any elevations of enzymes suggest either leakage (ALT, AST), or intrahepatic cholestasis or biliary tract inflammation (ALP, GGT, total bilirubin increases). In addition to enzyme assessment, liver function should be evaluated, either by function assays (if no changes in bilirubin are observed) or by careful review of albumin, cholesterol, glucose, BUN, and bilirubin as indicators of liver function. The degree of elevation or disruption of these values will not provide a diagnosis or prognosis, but will help direct the intensity of the search for cause and do help to point toward the areas of the liver most likely affected. As with all diseases of the liver, histopathology (or at least cytology) is required for a definitive diagnosis, and this is the most important step in determining treatment and prognosis.

**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 is 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. Because pancreatitis in cats may be an acute process (much like acute necrotizing pancreatitis in dogs) or a chronic (smoldering) disease (lymphoplasmacytic inflammation in patches)—the ability to detect inflammation by assessing pancreatic leakage can be tricky. Nevertheless, the best test of pancreatic leakage is the feline pancreatic lipase (fPL) test. In cats with acute disease, the test is very sensitive and specific (> 85%). However, in the more common chronic disease, the fPL can be normal or only slightly elevated, leading to difficulty in making a definitive diagnosis. Further, many cats will have concurrent IBD or cholangitis, thus it is important to consider it likely that pancreatitis is occurring in these cats due to the anatomic structure of the pancreatic ducts and connection to the common bile duct.

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 percent. 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 percent sensitivity and 88 percent 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, and may increase the risk of complications.

Further, many cats with chronic pancreatitis may develop pancreatic insufficiency (low TLI and concurrent EPI) thus measurement of cobalamin and folate, and TLI may be more useful than histopathology for assessing function. The bottom line is that 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 fPL and TLI (to test function) when making a diagnosis, and if surgical biopsies for liver or GI disease are being contemplated, a biopsy of the pancreas should be considered as well.

**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 newest member of the anti-emetic family, maropitant (Cerenia) is an NK-1 antagonist and very effective antiemetic. Recent studies in cats with chronic pancreatitis or other diseases with chronic intermittent vomiting or nausea have shown maropitant to be a very effective drug when used once daily or every other day as needed to control signs during flare-ups. The a2 adrenergic antagonists (phenothiazines) and 5-HT3 antagonists (ondansetron) appear to be the most effective anti-emetic agents in the cat for in-hospital therapy of severe vomiting (e.g., acute pancreatitis). Cats may be treated with chlorpromazine (a2 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.