Chronic vomiting is a common and frequently complex problem in dogs. Vomiting can be caused by both primary gastrointestinal diseases (e.g. infectious, inflammatory, parasitic, anatomic (obstructive, bones), drug-related or nutritional) and by extra-gastrointestinal (GI) diseases, such as endocrinopathies (e.g. addisons disease), metabolic disease (e.g. renal failure), inflammatory or other liver diseases, pancreatitis, and neoplasia (especially lymphoma). This wide spectrum of potential causes of vomiting in dogs 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.

The purpose of this seminar is not to present a comprehensive review of all causes of vomiting, but to provide an overview of some of the more common causes of vomiting, and to discuss the best approaches for diagnosis and treatment of these different problems. Where appropriate, the role of diet in both diagnosis and therapy of vomiting will also be considered.

Esophageal Disease

Most esophageal diseases that can be confused with vomiting result in regurgitation or dysphagia. However, true vomiting can occur with some esophageal diseases such as esophagitis, due to the discomfort or location of the lesion. Esophagitis is very difficult to diagnose without some form of imaging, as the condition may cause anorexia, pain, vomiting/regurgitation, or a combination of these signs. The most direct and specific method of diagnosis is endoscopy, which is not yet available in every practice setting. Dogs are more likely to develop esophagitis due to chronic vomiting, caustic ingestion, or reflux of gastric acid into the esophagus. The esophagus is less able to tolerate the presence of acid and as a result, the mucosal injury is both painful, causing anorexia, and can cause dysmotility – resulting in either regurgitation or even flaccidity. In addition to esophagitis, other esophageal diseases that must be considered in dogs with nausea or vomiting/regurgitation include megaesophagus, esophageal masses or foreign bodies, and esophageal stricture (due to esophagitis or previous injury) or gastroesophageal intussusception.

Primary Gastrointestinal Disease

The gastrointestinal (GI) tract should always be considered carefully when evaluating a dog that is chronically vomiting. However, vomiting is not pathognomonic for gastric or intestinal disease, as vomiting can occur due to a wide variety of systemic diseases having no direct link to the GI tract (other than through the vomiting center or CRTZ!). The initial evaluation of the GI tract
should include a minimum database (e.g., hematology, biochemistry profile, fecal exams, GI function testing, and urinalysis), radiographs and/or ultrasound. It is important to note that these tests may not always reveal the primary problem, but are necessary to rule out other systemic causing these signs. In some dogs, more invasive tests (e.g., gastroduodenoscopy, exploratory laparotomy) may be required to obtain the diagnosis. For example, gastric diseases to consider as causes of vomiting include parasites (e.g. physaloptera), bacterial infections (e.g. helicobacter or intestinal bacterial disease), neoplastic diseases (e.g. lymphoma, adenocarcinoma, leiomyosarcoma, etc), inflammatory diseases (e.g. ulcer disease), obstructive disorders (e.g. pythiosis, foreign bodies, masses), and nutritional (e.g. dietary overload/gluttony/eating-too-fast, intolerance, or bilious vomiting syndrome, etc). Specific diagnosis of each of those individual causes of vomiting may require additional procedures (e.g. culture for helicobacter species in addition to histopathologic evidence of spiral organisms in gastric glands) or approaches to rule out other causes of vomiting.

Small intestinal disease is also a cause of vomiting in dogs due to the prevalence of inflammatory disease. However, IBD must be distinguished from simply finding inflammatory infiltrates in the small bowel, as a wide variety of dietary, infectious, and parasitic agents will cause inflammation in the small bowel. However, dietary sensitivity or intolerance are important causes of vomiting and should also be considered as a primary differential when other causes of vomiting are ruled out. In some dogs, a true elimination diet (homemade diet of a single protein source and single carbohydrate source) or a hydrolyzed diet may be necessary to relieve the problem. In all cases of small intestinal disease, except food sensitivity, obtaining a definitive diagnosis will requires biopsy of the tissue – either via endoscopy or exploratory surgery.

Adverse Reactions to Food

Food sensitivity and food intolerance are the most common adverse reactions to food in dogs or 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 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 (dogs with food sensitivity require 6-12 weeks on the elimination diet before an improvement will be seen). Alternatively, in dogs 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). There are a variety of commercially available and
homemade elimination diets, as well as diets formulated with hydrolyzed proteins, that may be used in pets 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 dogs 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.

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 it is entirely reasonable to either try another diet from a different source, or try an entirely different dietary strategy (e.g. novel antigen, hydrolyzed, etc). Another consideration is that the dog may have a gastric emptying issue that will improve by taking into account the amount or type of food fed. For example, feeding a canned food diet may improve gastric emptying by reducing the amount of time the food spends in the stomach –especially if the vomiting is occurring several hours after eating. Alternatively, if canned food is not an option, feeding smaller meals more frequently, to reduce vomiting that occurs in dogs 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 dogs is a commonly diagnosed condition 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 some breeds that are more prone to development of IBD: German Shepherds, basenji's, soft coated Wheaten terrier, to name a few. 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 addition to food trials, the diagnostic plan for a dog with chronic diarrhea should include multiple fecal examinations or therapeutic deworming, assessment of adrenal status, and intestinal vitamin (cobalamin) status. Serum cobalamin levels may decrease with severe distal bowel disease, and in dogs with hypocobalaminemia, the diarrhea or GI signs will not resolve until replacement therapy is instituted. Cobalamin therapy (25 ug/kg q week) in some dogs with severe or permanent disease 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 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.

At this time, therapy of IBD 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 such as cyclosporine. In dogs that are intolerant of steroids, or in those in which steroids are no longer effective, immunosuppressive therapy may be necessary, and is often effective. In addition to cyclosporine, azathioprine may be indicated. 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. Finally, general agreement exists among gastroenterologists that elimination diets or novel protein, highly digestible diets are beneficial in dogss 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. There is increasing data in human IBD that probiotics and anti-oxidant, prebiotic nutraceuticals may be important components of therapy, and these may also be helpful in dogs, but no data are available to support or refute this claim.

**Extra-Gastrointestinal Causes of Vomiting**

One of the first steps in evaluating a vomiting dog 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, 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. 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.

**Non-specific Therapy of Vomiting**

There are a number of anti-emetic agents available for use in dogs that are vomiting. Some are more commonly used in the hospital setting because they are injectable and may require frequent administration. The $\alpha_2$ adrenergic antagonists (phenothiazines) and 5-HT$_3$ antagonists (ondansetron) appear to be the most effective anti-emetic agents. However, the new drug, Cerenia (maropitant) is an excellent central and peripheral acting antiemetic for dogs that has both injectable and oral forms. The advantage of this drug is that it can be given once daily. Cerenia should not be given to very young puppies (parvo) or to dogs for which a foreign body has not yet been ruled out as the cause of vomiting. Dogs may also be given chlorpromazine ($\alpha_2$ 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-HT$_3$ 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 somewhat less effective anti-emetic agents, but still have a place in the therapy of less severe cases of vomiting. 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.

References

