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Thought for the Month

“Women are like teabags, they don’t know how strong they are until they get in hot water.”

Eleanor Roosevelt

Would You Believe?

“Work like you don’t need the money, love like you’ve never been hurt, and dance like you do when nobody’s watching.

Anonymous

“Human Felicity is produced not so much by great pieces of good fortune that seldom happen, as by little advantages that occur every day.”

Benjamin Franklin



The Vomiting Cat

The clinical importance of vomiting stems from its association with a large and varied group of diseases, and the potentially life threatening consequences of vomiting per se, such as aspiration pneumonia, fluid and electrolyte depletion, acid-base derangement and esophagitis. Patient management should always be aimed at determining the medical significance of vomiting and detecting and treating the cause of vomiting. Where the cause is undetermined it is necessary to adopt a rational approach to controlling emesis.

Causes of Vomiting

There are so many potential causes of vomiting that it is often easiest to think in broad terms initially and consider more specific causes when vomiting is localized to one of the following groups:

Gastric: gastritis, ulceration, neoplasia, outflow obstruction, foreign bodies, motility/functional disorders

Intestinal: inflammatory bowel disease, neoplasia, foreign bodies, intussusception, functional disorders

Intra-abdominal non-GI tract:

Pancreas - pancreatitis, pancreatic neoplasia

Liver - hepatitis, cholangiohepatitis, biliary obstruction

Genitourinary - nephritis, pyelonephritis, nephrolithiasis, urinary obstruction, pyometra, peritonitis

Metabolic/Endocrine: uremia, hyperthyroidism, diabetic ketoacidosis, hepatic encephalopathy, hypoadrenocorticism, hypercalcemia, septicemia

Drugs: xylazine, digoxin, erythromycin, chemotherapy

Toxins: strychnine, ethylene glycol, lead

Dietary: indiscretion, intolerance, allergy

Neurologic: vestibular disease, encephalitis, neoplasia, raised intra-cranial pressure

Infectious: panleukopenia, FIP, salmonella infection, helicobacter infection

Parasitic: Ollulanus, heartworm

Patient Evaluation and Diagnostic Approach

The initial plan for vomiting animals is to separate those whose problems are acute and self-limiting from those who require more thorough investigation and treatment.

Acute Vomiting and Systemically Well: If vomiting is acute and the cat is systemically well with no historical or physical "red flags," further diagnostic testing is usually not warranted as vomiting often resolves on its own or after symptomatic therapy. If there is any doubt about hydration status a minimum data base consisting of a microhematocrit and total protein can be performed to more objectively evaluate hydration status. In kittens, a fecal examination to detect endoparasites may also be performed.

Chronic Vomiting or Systemically Unwell: If the cat is systemically unwell, has been vomiting for more than 10 days, or has hematemesis, bloody diarrhea or localizing signs such as abdominal pain or jaundice, a more aggressive work-up is necessary. The diagnostic approach described below should enable the clinician to detect the majority of causes of vomiting. The emphasis is on efficiently identifying conditions that require surgical intervention (e.g., septic peritonitis) and ruling out non-gastrointestinal causes of vomiting before proceeding to more specialized or invasive diagnostic procedures aimed at detecting primary gastric and intestinal disorders.

Most non-gastrointestinal causes of vomiting, and gastrointestinal causes such as focal masses or GI perforation, are usually detected, or ruled out, by taking a detailed history, performing a thorough physical examination, routine laboratory tests (CBC, profile, UA, fecal and T4, FeLV, FIV, pancreatic lipase/TLI, cobalamin and folate where indicated) and abdominal radiographs. Abdominal ultrasonography is useful for detecting pancreatic lesions, parenchymal abnormalities, GI thickening and sampling masses. If these tests are negative or show abnormalities compatible with primary gastric or intestinal disease, further workup for gastrointestinal disease is indicated (e.g., endoscopy, contrast radiography, exploratory laparotomy).

Clinicopathologic Testing

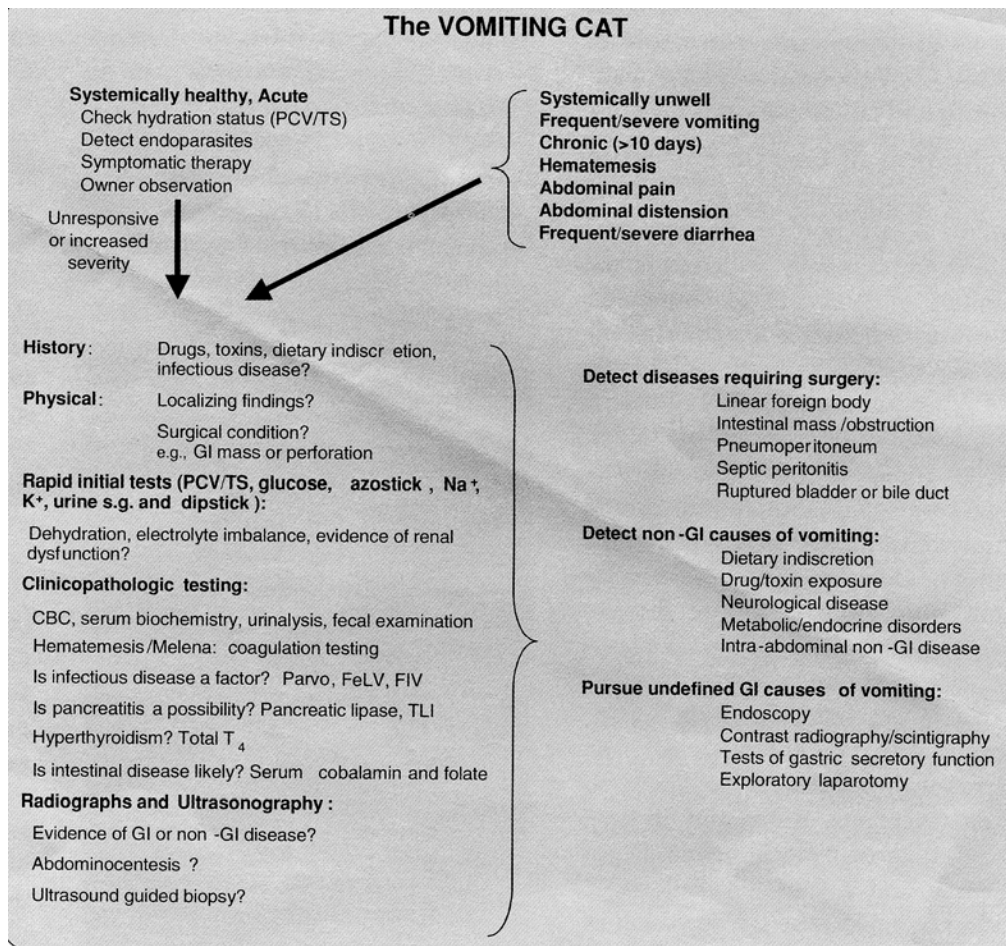
Clinicopathologic testing is used to detect the causes and consequences of vomiting. It is very important that blood and urine samples submitted for clinicopathological analysis are obtained prior to treatment.

Rapid initial tests are recommended for vomiting animals that are suspected of being dehydrated. These rapid tests are the measurement of microhematocrit (PCV), total solids (TS), blood glucose, blood urea nitrogen and a urine specific gravity and dipstick. Plasma concentrations of sodium and potassium should also be determined where possible. Blood and urine samples should be evaluated before treatment. These simple tests provide valuable information that helps to determine cause (e.g., azotemia and unconcentrated urine suggests renal disease) and guide initial management pending more definitive testing.

A complete blood count may yield abnormalities such as anemia (regenerative, non-regenerative), erythrocyte microcytosis, macrocytosis, basophilic stippling or Heinz bodies, and leukocytosis, leukopenia, eosinophilia or thrombocytosis that help to identify the cause of vomiting. For example, erythrocyte macrocytosis is relatively common in FeLV-infected cats, whereas eosinophilia may indicate hypereosinophilic syndrome or eosinophilic enteritis.

The serum biochemical profile should be evaluated for elevations in creatinine, urea, calcium, potassium, glucose, liver enzymes, bilirubin, cholesterol, triglycerides and globulin, and decreases in sodium, calcium, urea or albumin that are associated with nonGI causes of vomiting. Panhypoproteinemia that is not related to blood loss suggests a protein losing enteropathy; which in cats is most often associated with severe inflammatory bowel disease (IBD) or lymphoma. Determination of acid-base status by measurement of total CO₂ or venous blood gas analysis enables the presence of metabolic acidosis or alkalosis to be detected. This facilitates optimal supportive care and may also help to determine the cause of vomiting. For example, metabolic alkalosis accompanied by hypochloremia, hypokalemia and an acid urine - so called paradoxical aciduria - is highly suggestive of gastric outflow, or upper GI, obstruction. Venous blood gases and plasma osmolality are often determined in animals suspected of ethylene glycol ingestion, with the findings of metabolic acidosis and a high osmolal gap (determined by subtracting calculated from measured osmolality) supportive of ingestion. Urine should be evaluated for specific gravity, pH, glucose, casts, crystals and bacteria. The finding of white cell casts in the urine may be the only laboratory evidence that pyelonephritis is the cause of vomiting.

Additional clinicopathologic tests are required to detect hypoadrenocorticism (ACTH stimulation) - extremely rare in cats - liver dysfunction (pre- and postprandial bile acids), hyperthyroidism (T₄), pancreatitis (pancreas specific lipase and trypsin-like immunoreactivity), and intestinal disease (serum cobalamin and folate). When vomiting is accompanied by hematemesis or melena, coagulation testing is indicated. Coagulation testing is also indicated in patients with acute abdomen (abdominal pain) to detect DIC, and in those with chronic vomiting and diarrhea or weight loss to detect Vitamin K malabsorption. Infectious diseases associated with vomiting and diarrhea require fecal examination (giardia, endoparasites, Salmonella, Campylobacter) and parvovirus (ELISA) or serologic testing (FeLV, FIV) for diagnosis.



Diagnostic Imaging

Diagnostic imaging provides information that complements and extends clinicopathologic testing. The primary diagnostic imaging modalities employed to investigate vomiting are abdominal radiographs and abdominal ultrasonography. Radiographs are the test of choice for the initial evaluation of vomiting and acute abdomen. They provide information on gastric position and contents, size of the liver, kidneys and spleen, and may identify foreign bodies, GI obstruction, intussusception, peritonitis and changes suggestive of pancreatitis. Where radiography is inconclusive, ultrasound is employed to achieve a more accurate diagnosis. Ultrasonography is especially useful for detecting and localizing thickenings of the intestinal tract, lymphadenopathy, abdominal masses, radiolucent foreign bodies, and changes in the size and echogenicity of the pancreas, liver, kidneys or spleen. Ultrasonography also enables the detection of low volume abdominal effusions and detailed investigation of the abdomen of patients with large volume effusions and "white radiographs". Ultrasound guided aspiration is employed for sampling peritoneal fluid or parenchymal abnormalities. Ultrasound guided needle biopsy is also useful for non-invasive sampling of abdominal organs and parenchymal abnormalities.

Article to be continued in the next issue of Virginia-Maryland Veterinary Notes

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Fall Mushroom Toxicosis

A variety of mushroom species appear in mid summer and survive into the fall. One that has been problematic for dogs in the last few years during the fall is *Amanita muscaria*. This species of *Amanita* is unlike the more infamous *Amanita* spp., which initially cause GI problems and later cause fulminant hepatic and renal necrosis. *A. muscaria* generates more of a CNS syndrome with some initial GI effects.

A. muscaria comes in a number of varieties. Different varieties have various colored caps. All *A. muscaria* mushrooms have distinctive white ‘warts’ or patches on their cap, which has a diameter of 2-6 inches. The most distinctive variety is *A. muscaria* var. *muscaria* with its very red to scarlet colored cap. In the Eastern U.S., we more typically find *A. muscaria* var. *formosa* with a yellow colored cap or *A. muscaria* var. *alba* with a white to cream colored cap. All *A. muscaria* mushrooms and *A. pantherina* mushrooms contain ibotenic acid, muscimol and an insignificant amount of muscarine. The muscarine toxin was the initial one isolated and was the reason for naming the species. However, ibotenic acid and muscimol are responsible for the majority of the CNS signs, since they are able to cross the blood brain barrier and muscarine cannot. Ibotenic acid is in highest concentration in the mushroom. Muscimol is a decarboxylation product of ibotenic acid that is formed to some degree in the mushroom, but more significantly after ingestion.

Most of the related case reports in the past have involved *A. pantherina* toxicosis in dogs and cats. *A. muscaria* cases have only been documented in dogs; but because cats are known to ingest mushrooms, *A. muscaria* poisonings should also be considered possible in cats. Few toxicity trials have studied the toxicity of either ibotenic acid or muscimol in dogs or cats. A single mushroom (*A. pantherina*) has been lethal for 5 wk old Labrador puppies. Ibotenic acid is a glutamate agonist in the body. Glutamate is an excitatory neurotransmitter in the CNS. Muscimol, on the other hand, is a GABA agonist. GABA agonists are CNS inhibitors causing CNS depression.

Onset of clinical signs is usually within 1- 2 hr after consumption. Initial clinical signs in dogs often involve GI problems of vomiting, excess salivation and possibly diarrhea. CNS problems initially relate to CNS excitation and include clonic-tonic convulsions, muscle fasciculations, opisthotonus and fly-biting activity. Later in the course of the syndrome, dogs are often depressed and somnolent for 24-48 hr. Miosis and bradycardia are also likely clinical signs. Dogs experiencing *A. muscaria* toxicosis have a fair-guarded prognosis with prompt medical attention. Most have returned to normal over a period of several days with symptomatic treatment.

An empirical diagnosis can be made in the fall by asking about potential mushroom availability and ingestion. Vomitus or feces may contain white mushroom bits. The owner may be able to bring in a mushroom for identification. If the mushroom is sent to a specialist for identification, it should be wrapped in paper towels, put in a paper bag and refrigerated. Plastic bags cause accelerated autolysis of mushrooms and make identification impossible. Few diagnostic labs offer analysis of serum or urine for ibotenic acid and muscimol.

Treatment is based on first alleviating CNS convulsions. Diazepam has been effective in most cases although multiple injections have been required. Methocarbamol may be a longer lasting alternative to diazepam. If the suggested insert dose of methocarbamol is insufficient to control the convulsions, additional therapy with diazepam or a short acting barbituate may be required. Some recent cases have required constant rate infusions with phenobarbital, diazepam or propofol. Early presentations within 2-3 hours post ingestion may benefit from emesis or gastric lavage followed by activated charcoal combined with an osmotic cathartic such as sorbitol or sodium sulfate. Severe salivation or bradycardia can be controlled with a pre-anesthetic dose of atropine.

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Would You Believe?

The human brain is incapable of processing the emotions of laughter and stress simultaneously.

Determinants of Adoption and Euthanasia of Shelter Dogs

Pet overpopulation is a reality faced by animal shelters across the nation, and few solutions exist for effectively decreasing the numbers of unwanted pets. An estimated six to eight million dogs and cats enter animal shelters each year. Of this population, owners reclaim approximately 15% of pets and 25% are adopted, leaving three to four million dogs and cats to be euthanized. In one report, 76% of dogs were adoptable at the time of entry to the shelter in the opinion of the relinquishing owner. A cross-sectional study of cats and dogs in the United States found that an average of only 30% of animals were sterilized; thus, a major factor in pet overpopulation was lack of owner compliance in neutering programs. Between 10% and 25% of the pet population in the United States is euthanized each year because of a surplus population.

At the University of California, Davis (UCD), shelter dogs are neutered by veterinary students and then returned to the shelter for adoption. The rates of adoption and euthanasia of the dogs neutered at UCD were contrasted with a comparison shelter group to determine the effect of pre-adoption neutering. This study contains information on a total of 573 dogs neutered at UCD (226 from Sacramento County, 347 from Yolo County) and 1301 comparison dogs (643 from Sacramento County, 658 from Yolo County). The UCD-neutered dogs had a lower rate of euthanasia than the comparison shelter group at the shelters investigated. At Sacramento County Animal Care and Regulation, 73 % of the UCD group but only 36% of the comparison group were adopted. At Yolo County Animal Services, 71 % of the UCD group and 45% of the comparison group were adopted. The sex of an animal did not significantly affect the rate of euthanasia. Dogs that were predominantly pit bull, rottweiler, or chow breeds had higher rates of euthanasia than other breeds, independent of neuter status. Also, juveniles (less than one year old) had lower rates of euthanasia than adults, independent of neuter status. UCD adult dogs had lower rates of euthanasia than comparison adults.

Post-surgical UCD dogs spent a longer average time in the shelter before adoption (15 days at Sacramento; 16 days at Yolo) than the comparison dogs (11 and 12 days, respectively). UCD dogs also spent a longer average time in the shelter before euthanasia (18 and 25 days, respectively) than the comparison dogs (13 days at both shelters). Lower probabilities of euthanasia for behavioral or medical reasons were found for UCD dogs than for the comparison dogs. The probability of euthanasia for reasons of space limitations increased with time in shelter for both groups. In this study, pre-adoption neutering increased adoptions without increasing the probability of medical or behavior euthanasia.

Surgery prior to adoption is in the best survival interest of the individual animal, as well as alleviating further overpopulation. Teaming veterinary education with shelter neutering programs can provide students with practical surgical knowledge in addition to an understanding of overpopulation and shelter management issues.

Taken from: Clevenger, J. and P. H. Kass J Vet Med Educ 30:372-378, 2003, as reported in VetMed, Volume 10, Issue 3, May 2004, Iowa State University, Ames, IA

Memory

Frequent short-term memory lapses (“senior moments”) are known as mild cognitive impairments (MCI). While not serious, 15 per cent of those with MCI go on to develop Alzheimer’s Disease every year. About 60 biotech and pharmaceutical companies are working on the development of “memory” pills, and several are in human trials and could be on the market within a few years.

India has the lowest incidence of Alzheimer’s in the world. Could curry be an answer?

Studies indicate that the hippocampus is where impressions and occurrences turn into memories. Through a complex process involving neurotransmitters and synapses, neurons in the brain band together to retain data as memory. As we age, this intricate process occurs more and more slowly.

Mast Cells and Eosinophils in Feline Allergic Dermatitis: A Qualitative and Quantitative Analysis

Mast cells (MCs) and eosinophils are prominent in the perivascular infiltrate of cats with allergic dermatitis. In the skin of allergic cats MCs were mainly observed diffusely in the superficial dermis, while eosinophils were found mainly in the deep dermis in a perivascular pattern. MC counts were significantly higher in cats with allergic dermatitis ($P < 0.05$) than in healthy control cats, but the number varied widely. Moreover, the numbers of eosinophils in the skin of allergic and control cats differed significantly ($P < 0.05$), none being found in the latter. There was no significant correlation between numbers of mast cells and eosinophils in the same biopsy sample. In the allergic cats, a significantly lower number of MCs was detected by staining for tryptase than by staining for chymase or by Astra blue staining. Additionally, the chymase: tryptase ratio in healthy cats was reversed in cats with allergic dermatitis. These changes were observed in lesional and nonlesional skin of cats with allergic dermatitis. The findings indicate a generalized effect on MCs in allergic dermatitis. In addition, eosinophils are an important indicator of allergic dermatitis.

J. P. Koeman, Dept of Pathology, Faculty of Veterinary Medicine, T. Thepen, Dept of Dermatology/ Allergology, Faculty of Medicine. and T. Willemse and P. J. Roosje, Dept of Clinical Sciences of Companion Animals All are from Utrecht University, The Netherlands
Journal of Comparative Pathology Volume 131, Issue 1, July 2004, Pages 61-69
As reported in Veterinary News, July 2004, Penn State University, University Park, PA

Continuing Education Opportunities

<u>Date</u>	<u>Topic</u>	<u>Location</u>	<u>Contact Hours</u>
October 14 & 15, 2005	Introductory Echocardiography	Blacksburg	10
October 21-23, 2005	Advanced Echocardiography	Blacksburg	21
October 27 & 28, 2005	Applied Ultrasonography	Blacksburg	10
November 12, 2005	Urinalysis & Hematology	Blacksburg	6
November 18 & 19, 2005	Diagnostic Ultrasonography	Blacksburg	10
	2006		
March 10 & 11, 2006	Introductory Echocardiography	Blacksburg	10
March 24 & 25, 2006	Thoracic Radiology	Blacksburg	10
March 31 & April 1, 2006	Applied Ultrasonography	Blacksburg	10
April 21 – 23, 2006	Advanced Echocardiography	Blacksburg	21
May 6, 2006	Radiography for Technicians	Blacksburg	6

Please note:

The courses listed above are limited enrollment and feature a hands-on laboratory experience under the guidance of clinical faculty members. Program brochures provide course details. For more information, please contact **Anne Cinsavich**, aclapsad@vt.edu (540) 231-5261; or to register for a program, please contact **Conference Registration**, Continuing Education Center, (540) 231-5182.

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