VIRGINIA-MARYLAND VETERINARY NOTES

Veterinary Teaching Hospital, Virginia-Maryland Regional College of Veterinary Medicine

April - June, 2005 No. 114

WHAT'S INSIDE!

Thought for the Month

Man blames fate for other accidents, but feels personally responsible when he makes a hole-in-one.

Author unknown

Virginia Tech

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

This newsletter is published quarterly in support of the outreach program of the Veterinary Teaching Hospital VMRCVM, Blacksburg, VA and is prepared for and distributed to veterinarians in the Mid Atlantic Region

Client Compliance

A major problem in human healthcare is the failure of patients to take prescribed medications. It is estimated that almost half of all patients under a physician's care don't follow their doctor's orders; and this can result in as many as 125,000 deaths each year from cardiovascular disease alone.

A similar problem exists in veterinary medicine, causing not only poor treatment results, but a significant level of frustration among practitioners. What are the reasons for this noncompliance, and what can be done about it?

Among the more common reasons (or excuses) are:

- Patient improvement (real or apparent)
- Forgetfulness/apathy
- Failure to understand instructions
- Fear of adverse effects
- Financial/economic concerns
- Overly complex instructions/regimen
- Inconvenient dosing schedule
- Inability to give medications (intractable patient)
- Lack of faith in diagnosis

Valid or not, these reasons can often prevent clients from following even a well conceived plan of therapy. The question becomes, how do practitioners increase the level of compliance among their clients?

The best answer, assuming the veterinarian has truly done a good job of explaining the diagnosis, the treatment and the medications to be administered, is to provide effective follow up by a trained staff member at regular intervals starting soon after the client's visit to the practice. This may even involve a house call by a staff member when deemed appropriate following telephone or e-mail contact.

Many human health plans are actively involved in patient compliance problems as they can have serious detrimental effect on treatment results by physicians. Many, if not all, veterinary practices would undoubtedly benefit, and show improved treatment results, with a program specifically designed to proactively stimulate or encourage client compliance. Incentives, such as lower premiums and co pays (or higher for non-compliance), may be offered by human health plans. The secret to a successful compliance program would be a kind but insistent approach that has adequate resources assigned and budgeted to the problem. It should be an important part of the practice plan worthy of trained personnel and the active support of management. Staff should be educated as to the importance and critical need for compliance with treatment directions and dispensed medications.

Client compliance begins with their understanding the need for compliance and the answers to all of their questions. Directions should be in easily read and understood form with a specific request to report patient progress at regular intervals. Clients who comply with treatment instructions might well be rewarded in some way such as discounts for certain services or products by the practice.

Compliance is often critical. It is worthy of a well planned effort in any practice.

Kent Roberts, DVM
Blacksburg, VA

Would You Believe?

There are approximately 450 species of lady bugs (beetles) in the U.S. The larvae of the species will eat up to 50 aphids a day.

National Audubon Society

Easter Lilies and Cats

' Tis the season when small animal veterinarians should be on the lookout for cases of Easter lily toxicosis in cats. Approximately 15 years ago, Easter lily poisoning in cats was recognized as a problem by the National Animal Poison Control Center. The scientific name for Easter lily is *Lilium longiflorum*. Since then, many other lilies in the *Lilium* genus have also been associated with toxicoses. Some of these include: Tiger lilies, Asiatic hybrid lilies, Japanese lilies, Red lilies, Rubrum lilies, Stargazer lilies, Western lilies, and Wood lilies. The *Lilium* genus contains approximately 100 potentially toxic species and innumerable hybrids. In addition to the *Lilium* genus, Day lilies of the *Hemerocallis* genus also cause similar problems

At this time, there are only case reports of poisonings in cats. Dogs that have consumed significant amounts of lilies have minimal GI problems that are not life threatening. All parts of the plant should be considered toxic. Recent research has shown that the flower is especially toxic. As little as a single bite of the plant may cause a problem. All suspected ingestions of any plant in the *Lilium* or *Hemerocallis* genera should be treated as possible toxicoses for cats. The toxin(s) in lilies is unknown and therefore, so is the mechanism of action.

The onset time for the initial GI signs is usually within 3 hours of ingestion. These initial signs include vomiting, salivation, anorexia and depression. Polyuria and urine abnormalities are evident within 12-24 hours after toxic ingestions. Polydipsia has also been noted in some cases. Dehydration and increases in serum renal indices are usually noticed around 24 hours post ingestion. Subsequent problems include a reoccurrence of vomiting, oliguria, anuria, weakness, recumbency, hypothermia and death within 3-7 days. Necropsy lesions include swollen kidneys with perirenal edema. Oral and GI ulcerations associated with uremia are also sometimes present. Histologically, the kidneys have severe proximal tubule nephrosis with hyaline or granular casts in the tubules. A few cases have vacuolation of exocrine acinar cells in the pancreas.

Diagnosis is based on history of access to a lily plant and compatible clinical pathology abnormalities. Clinical pathology abnormalities in urine usually include glucosuria, proteinuria, cylindruria, and isosthenuria that show up within 12 hours of exposure and are present until anuria sets in. Increased serum BUN and creatinine and increased serum potassium and phosphorus are next to appear. The increase in creatinine is often disproportionate to the increase in BUN. Creatinine values of 15-20 mg/dl are common and have been reported as high as 53 mg/dl. BUN values typically range from 75-200 mg/dl.

Treatment is empirical. Cats that are observed ingesting lilies should be brought to the clinic immediately. Emesis should be induced followed by activated charcoal mixed with sorbitol or a saline cathartic. Isotonic saline should be administered IV at twice maintenance rate for a minimum of 24-48 hours. Hyperkalemia and metabolic acidosis may require additional treatments. Vomiting also needs to be controlled with metoclopramide.

Prognosis is good if treatment is instituted within 6 hours of ingestion. The prognosis is guarded to poor if treatment is delayed until renal problems have begun.

Be proactive in informing clients of the potential for this life-threatening toxicosis during this time of the year. Many homes contain both cats and Easter lilies!

Dennis Blodgett, D.V.M., Ph.D., Diplomate, A.B.V.T., Toxicology, Virginia-Maryland Regional College of Veterinary Medicine, Va. Tech, Blacksburg, VA

Would You Believe?

Finland, Sweden, Denmark & Germany all fine speeders on their roads a percentage of the speeder's income.

Cardiopulmonary Cerebral Resuscitation: Techniques

Cardiopulmonary arrest (CPA) is an unfortunate but common occurrence in veterinary medicine. CPA is defined as sudden cessation of spontaneous and effective respiration and heartbeat. Veterinary staff should prepare for CPA by regularly reviewing the standard "ABCs" (i.e., airway, breathing, circulation) techniques of cardiopulmonary cerebral resuscitation (CPCR) and veterinary practices should have an emergency kit ready at all times.

- Place the endotracheal tube, and check placement via direct visualization or an ETCO2 monitor.
- Connect the Ambu bag or anesthetic machine to the rebreathing bag.
- Initiate respiratory assistance (8-12 breaths/ min; smaller dogs may need a higher rate).
- Initiate chest compressions (80-120/min) using the cardiac pump technique in animals <15.4 lb (7 kg) or the thoracic pump technique in animals >15.4 lb (7 kg).

Airway - When an animal is not breathing, the first priority is to assess the airway. Placing an appropriately sized, cuffed endotracheal tube is often the quickest and easiest way to establish and maintain a patent airway.

Breathing - Once the airway has been secured, artificial ventilation can commence. An Ambu bag or anesthetic machine with a rebreathing bag may be used. Mechanical ventilators should not be used because they may be affected by pressure and volume changes caused by chest compressions during CPCR. One hundred percent oxygen delivery is recommended.

A respiratory rate of 8 to 12 breaths/minutes is indicated in most patients. Smaller animals may require higher respiratory rates. Some protocols have suggested rapid respiratory rates, applied simultaneously with each compression (i.e., 1:1 simultaneous compression ventilation) to increase intrathoracic pressure. However, 1:1 simultaneous compression ventilation tends to increase right atrial pressure more than aortic diastolic pressure, so coronary perfusion pressure and myocardial blood flow may actually decrease. Minute ventilation is increased by thoracic compression alone, without any change in the respiratory rate, and the risk of barotrauma with overventilation favors using lower respiratory rates.

A tidal volume of 10 to 15 ml/kg should be used and may be assessed visually as the point at which an animal's chest first expands. Overinflation of the lungs during CPCR may lead to barotrauma, pulmonary hemorrhage, and pneumothorax.

Circulation - Chest compressions are fundamental to CPCR. The goal of compressions is to generate adequate blood flow to reach the target organs, which are the myocardium via the coronary arteries and the brain via the cerebral arteries. In veterinary patients, the operator should maintain 80 to 120 compressions per minute, with equal time for compression and decompression (i.e., a 50% compression-decompression cycle). The cardiac pump compression technique should be used in cats and small dogs (i.e., <15.4 lb [<7 kg]). The thoracic pump technique should be used in animals weighing more than 15.4 lb (7 kg).

It has been shown that within the first few minutes of CPA, blood is still well oxygenated; thus myocardial oxygen delivery is affected more by blood flow than by oxygen saturation. Chest compressions provide some air movement in the lungs without additional ventilation; so if a rescuer is initially alone when commencing CPCR, compressions have a greater chance of providing both circulatory and some ventilatory support than does assisted ventilation. Electrocardiogram (ECG) monitors should be attached to the patient. Much of the progression of CPA is monitored via ECG changes.

Taken from: Haldane, S., and S. L. Marks Compend Cont Educ Pract Vet, pp 780-790, 2004, as reported in VetMed, Volume 11, issue 2, January, 2005, Iowa State University, Ames, Iowa

Cryptosporidium Infections in Cats and Dogs

Cryptosproidium are coccidia-like parasites that develop in the microvillous border of epithelial cells in the digestive, respiratory, and urinary tracts of vertebrates. Cryptosporidia displace the microvillous border and eventually lead to loss of mature surface epithelium. In the intestinal tract, this causes shortening and fusion of villi and lengthening of the crypts due to acceleration of cell division to compensate for loss of cells. The result is reduced uptake of fluids, electrolytes, and nutrients from the gut lumen. Clinical signs of cryptosporidiosis in cats and dogs vary from none to chronic or intermittent diarrhea. Fluids and other supportive measures should be used in animals with diarrhea, but there is no proven safe and effective treatment of cryptosporidiosis. Cryptosporidia oocysts are very resistant to environmental damage, chlorination, and standard cleansers. This makes *Cryptosporidium spp* an important food- and waterborne pathogen. Extreme temperatures and prolonged contact with ammonia destroy the oocysts.

The small size of *Cryptosporidium* oocysts makes them difficult to detect. Oocysts are often overlooked unless an examiner is specifically looking for them. Fecal flotation techniques used routinely in veterinary laboratories are adequate to demonstrate Cryptosporidium oocysts if large numbers are present. The slide should be examined using the high-power objective. Sheather's sugar solution is the best flotation medium. They are light pink and a central residual body is usually visible in Cryptosporidium oocysts in fecal flotations. Fecal samples sent to diagnostic laboratories can be tested using a number of procedures.

Cryptosproidium was recognized as an important zoonosis in the early 1980s. Early studies assumed that all infections in mammals, including humans, were caused by the parasite *Cryptosporidium parrum*. Recent studies using molecular biologic tools and host-specificity studies indicate that cats and dogs have their own unique species of *Cryptosporidium* (*C. felis* and *C. canis*, respectively). Surveys indicate that up to 38.5% of cats and up to 44.8% of dogs are infected with *Cryptosporidium* spp. *Cryptosporidium felis* is primarily found in cats and *Cryptosporidium canis* in dogs; *Cryptosporidium hominis* is the newly recognized parasite in humans. Molecular studies indicate that *C. hominis* and *C. parrum* have been responsible for drinking waterassociated outbreaks of human cryptosporidiosis.

Initial studies indicate that owning a cat or dog does not increase the risk of humans acquiring cryptosporidiosis, although human infections with *C. felis* and *C. canis* have been found in patients with AIDS, immunosuppressed patients, and children from impoverished areas.

Current guidelines from the US Public Heath Service and Infectious Diseases Society of America recommend that HIV-infected humans should not take into their homes stray dogs or cats, animals with diarrhea, or dogs and cats younger than 6 months of age. They further recommend that if a dog or cat younger than 6 months of age is acquired by an HIV infected person, the animal should be tested for *Cryptosporidium* spp.

Taken from: Lindsay, D.S. and A.M. Zajac, compend Cont Educ Pract Vet, pp 864-874, 2004, as reported in VetMed, Volume 11, issue 2, January, 2005, Iowa State University, Ames, Iowa

Would You Believe?

One Third of the world's shoes are made in Guangdong, China, the province that borders Hong Kong. Factories there make a shoe in 10 hours compared to 25 days four years ago.

China has 114 million migrants, people who left villages to work in cities.

Wall Street Journal

Giardiasis Surveillance – United States, 1998-2002

Problem/Condition: Giardiasis, a gastrointestinal illness, is caused by the protozoan parasite *Giardia intestinalis.*

Abstract: During 1998--2002, the total number of reported cases of giardiasis decreased from 24,226 for 1998 to 19,708 for 2001 and then increased to 21,300 for 2002. The number of states reporting giardiasis cases increased from 42 to 46; however, the number of states reporting more than 15 cases per 100,000 population decreased from 10 to five. A greater number of case reports were received for children aged 1-9 years and for adults aged 30-39 years compared with other age groups. Incidence of giardiasis was highest in northern states. Peak onset of illness occurred annually during early summer through early fall.

Introduction

Giardia intestinalis (also known as *G. Iamblia* and *G. duodenalis*) is the most common intestinal parasite identified by public health laboratories in the United States. This flagellated protozoan causes clinical illness (i.e., giardiasis) characterized by diarrhea, abdominal cramps, bloating, weight loss, and malabsorption; however, asymptomatic infection also frequently occurs. Case reports indicate that giardiasis also might be associated with the development of reactive arthritis. A zoonotic disease, giardiasis also affects domestic and wild mammals (e.g., cats, dogs, cattle, deer, and beavers).

Giardia infection is transmitted by the fecal-oral route and results from the ingestion of Giardia cysts through the consumption of fecally contaminated food or water or through person-to-person or animal-to-person transmission. The cysts are infectious immediately upon being excreted in feces. The infectious dose is low; ingestion of 10 cysts has been reported to cause infection. Infected persons have been reported to shed <109 cysts in their stool per day and to excrete cysts for months.

Persons at increased risk for infection include 1) travelers to disease-endemic areas; 2) children in child care settings; 3) close contacts of infected persons (e.g., those in the same family or household or in the child care setting); 4) persons who ingest contaminated drinking water; 5) persons who swallow contaminated recreational water (e.g., water in lakes, rivers, and pools); 6) persons taking part in outdoor activities (e.g., backpacking and camping) who consume unfiltered, untreated water or who fail to practice hygienic behaviors (e.g., hand washing); 7) persons who have contact with infected animals; and 8) men who have sex with men. The relative contribution of person-to-person, animal-to-person, foodborne, and waterborne transmission to sporadic human giardiasis in the United States is unknown.

Although giardiasis cases can occur sporadically, outbreaks are well documented. During 1991--2000, Giardia was identified as a causal agent of 9.4% (10 of 106) of reported recreational water associated and 16.2% (21 of 130) of reported drinking water-associated outbreaks of gastroenteritis of known or suspected infectious etiology. Additionally, foodborne outbreaks of giardiasis linked to infected food handlers and uninfected food handlers who diapered infected children have been reported. Outbreaks resulting from person-to-person transmission in child care centers also have been reported.

In 1992, the Council of State and Territorial Epidemiologists (CSTE) assigned giardiasis an event code (code 11570) to facilitate transmission of reported giardiasis data to CDC. Reporting of giardiasis as a nationally notifiable disease began in 2002. This report summarizes national giardiasis surveillance data for 1998--2002. **The full report with references can be found on the CDC/MMWR web site: http.//www.cdceov/mmwr/ preview/mmwrAtml/ssS401a2.htm. The CDC fact sheet is found at: http.//www.cdc.eov/ncidod/dpd/parasites/ ciardiasis/factsht giardia.htm, as reported in Peen State Veterinary News, January 2005**

Trimethoprim-Sulfadiazine and Thyroid Function

Sulfamethoxazole and sulfadiazine are the most commonly used sulfonamides in equine medicine, but only sulfadiazine is approved for use in horses. Antithyroid effects associated with sulfonamide therapy have been demonstrated in a variety of species, including humans and dogs. Thyroid function apparently normalizes in most species after discontinuation of sulfonamide therapy. However, in dogs abnormal thyroid function can persist for 8 to 12 weeks after discontinuation of therapy.

Trimethoprim-sulfadiazine was administered to horses in a randomized, placebo controlled study to determine the effects of potentiated sulfonamides on thyroid function in normal horses. The treatment group included 8 horses that received trimethoprim-sulfadiazine mixed with molasses orally at 30 mg/kg once daily for 8 weeks. The control group included 8 horses that received an oral placebo (flour mixed with molasses) once daily for the same period. Thyroid function was evaluated prior to initiation of treatment and after 8 weeks of treatment. Serum concentrations of total and free triiodothyronine (T3), total and free thyroxine (T4), and thyroid stimulating hormone (TSH) were determined at rest and after a thyrotrophin-releasing hormone (TRH) stimulation test. There was no detectable difference between treatment and control groups.

Taken from: Rothschild, C. M., et al J Vet Intern Med 18:370-373,2004, as reported in VetMed, Volume 11, issue 2, January, 2005, Iowa State University, Ames, Iowa

Would You Believe?

Life expectancy in 1935 (the year Social Security started) was 62 years. It has increased to 78 years in 2004. Fertility rates are down from 3.7 children per woman to two children. The worker retiree ratio is down from 16 to 1 in 1950, to 3 to 1 now. Social Security benefits will exceed payroll tax revenue in 2018 according to the latest estimates.

Continuing Education Opportunities

Date	Topic	Location	Contact Hours
May 6, 7 & 8, 2005	**Advanced Echocardiography**	**Blacksburg**	**21**
May 16 – 20, 2005	**Intensive Orthopedic Week**	**Blacksburg**	**40**
November 18 & 19, 2005	**Diagnostic Ultrasonography**	**Blacksburg**	**10**
September 9 & 10, 2005	**Applied Ultrasonography**	**Blacksburg**	**10**
October 14 & 15, 2005	**Introductory Echocardiography**	**Blacksburg**	**10**
October 21-23, 2005	**Advanced Echocardiography**	**Blacksburg**	**21**

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.

Virginia-Maryland Regional College of Veterinary Medicine Extension Staff:

Dr. W. Dee Whittier	Extension Specialist – Beef Cattle
Dr. Scott Pleasant	Extension Specialist – Equine
Dr. John Currin	Extension specialist – Dairy Cattle
Anne Cinsavich	Continuing Education/Extension

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BLACKSBURG, VIRGINIA 24061

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