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"Pearls" of Veterinary Medicine

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Furosemide as an anticonvulsant

Among the many purported neuroprotective effects of furosemide, it has been shown to ***suppress epileptiform activity***, likely through neuronal ion changes. This effect may be of particular use in status epilepticus, where animal models and human studies seem to indicate a beneficial effect. As always, further research is needed before this can be a strong recommendation, but furosemide should be considered in refractory cases where standard therapies fail. The side effect of decreased intravascular volume and consequent diminished blood pressure/perfusion should be weighed against any potential benefit.

Tony Johnson, DVM, DACVECC
N Amer Vet Conf, 01:15

Label dose vs. reality

Acepromazine is a phenothiazine tranquilizer. The label dose is 0.5-1.1 mg/kg in dogs (IV, SC, IM) and 1.1-2.2mg/kg in cats. Unfortunately this is ***much higher than appropriate***. The current recommended doses in dogs and cats are 0.05 and 0.1 mg/kg. The higher dose results in increased adverse effects such as hypotension and prolonged durations of effect, but does not provide increased sedation. Procaine penicillin G is labeled for use in dogs for a variety of infections including otitis externa. Otitis externa often involves *Staphylococcus* spp. which are most often resistant and *Malassezia* (yeast) which are not susceptible to penicillin. The listed dose of 6000 IU per kg, q24h is too low and increases the risk of treatment failure and resistance. The current dosage recommendations are 20,000-40,000 IU/kg, q12-24h, IM for susceptible infections.

Butch KuKanich, DVM, PhD, DACVCP
CVC Kansas City, 08:15

Dexmedetomidine as an emetic

Administration of xylazine has been recommended for induction of emesis in cats; however, with the advent of many new and safer anesthetic agents, small animal practices may no longer be stocking xylazine. In a review of medical records for 47 cats in which induction of emesis was required because of a history of suspected ingestion of a toxic substance or foreign material, 9 of the 21 (42.9%) cats that received xylazine vomited and 15 of the 26 (57.7%) cats that received dexmedetomidine vomited. Results indicated that dexmedetomidine was a ***comparable alternative to xylazine*** for this purpose, but prospective studies are needed to determine the optimal IM dose of dexmedetomidine for induction of emesis in cats. The dose of dexmedetomidine in this study was 2.7-8.2 µg/lb, IM.

JAVMA, Apr 15, 2016
Jennifer L. Willey, DVM et al.

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OA in the cat

The following terms - arthritis, osteoarthritis, or DJD – are found in different journal articles addressing this feline condition. However, arthritis is defined as inflammation of the joint, whereas DJD consists of both inflammatory and non-inflammatory disease processes. The latter is what occurs in cats, leading to the degeneration or destruction of synovial (appendicular) or cartilaginous (intervertebral disc) joints. NSAIDs are the mainstay of pharmacologic treatment for DJD in cats as well as other species. NSAID's that are prescribed for cats should be used. These include meloxicam (Metacam) and robenacoxib (Onsior), but neither is approved for long-term use within the US. Both however have been used in long-term studies and meloxicam is approved for long-term in Canada, Europe, and several other countries. If meloxicam or robenacoxib are used long-term in the US, it is recommended that owners sign a waiver. Dosing should be by lean body weight. Owners should be warned to stop medication and call the veterinary practice if the cat is not eating, is vomiting, or any other changes. The patient should be reassessed for comfort as well as for diagnostic monitoring. The author does taper meloxicam to every other or every 3rd day when possible. Although veterinarians are often concerned about NSAID use in cats with

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concurrent chronic kidney disease (CKD), some studies have indicated safety at lower doses in cats with stable stage 1 or 2 CKD. One study indicated safety with 0.01–0.03 mg/kg, q24h.

Ilona Rodan, DVM, DABVP
Music City Vet Conf, Feb 2016

Add-on seizure control, cat

Topiramate (Topamax) as an add-on to phenobarbital: Start with 1/2 of a 15 mg capsule, SID, mixed in food. Some cats require an entire capsule. Can gradually increase dose to a 25 mg capsule, BID (cheaper to have the owners quarter a 100 mg tab). No studies to document safety of this drug. This author has used it in a few cases with no obvious side effects.

Jared B. Galle, DVM, Diplomate ACVIM
Mich Vet Conf, 01:14

Chronic kidney disease, early diagnosis

Early diagnosis offers some potential advantages for treatment outcomes in patients with CKD. Because there is more residual renal function remaining, early intervention has a much greater impact on length of survival. And most therapeutic strategies are likely to be more effective when they are applied early versus later in the course of disease. It seems reasonable to recommend a therapeutic renal food (or a food with a "renal-friendly" nutrient profile) because this is the only therapeutic intervention that has been shown to significantly improve survival time in cats with IRIS Stages 2&3 CKD. Some have recommended introducing a renal diet earlier in the course of CKD (when the cat is clinically well) because of the belief/clinical experience that dietary acceptance may be higher than waiting until disease has progressed. Another approach is to carefully monitor and implement nutritional changes as soon as there is any evidence of progression (e.g., increasing SDMA, UPC, serial creatinine values) in cats with Stage I CKD. Based on published evidence, feeding a therapeutic renal food is ***the single-most effective treatment*** for improving survival and quality of life in cats with CKD.

S. Dru Forrester, DVM, MS and Jane Robertson, DVM
3rd World Fel Conf

Withholding food after surgery

Withholding food after GI surgery makes intuitive sense, and food withholding was the standard of care in human and veterinary surgery for many years. There is overwhelming evidence that withholding food is ***more detrimental to intestinal healing than early feeding***. Small molecules (e.g., short-chain fatty acids, glutamine) are the key nutrients for enterocytes, and their presence in the intestinal lumen stimulates enterocyte proliferation. Early enteral feeding leads to higher intestinal bursting pressure after anastomosis in experimental dogs and less clinical dehiscence, lower mortality, shorter hospital stays, and fewer postoperative infections in human clinical trials. This author's practice is to offer a small meal of highly digestible food when the patient is fully recovered from anesthesia. Consider placing a feeding tube at the time of surgery if the patient has experienced extensive weight loss or if the patient is expected to not eat within the first few days of surgery.

Sabrina L. Barry, DVM, DACVS
NAVC Clin Brf, Apr 2016

Nutritional plan for geriatrics

As human age, nutritional requirements change. Likewise, as the dog and cat patient age, nutritional requirements may also change. The standard formula for resting energy requirements in Kcal per day is equal to the weight in kilograms, multiplied by thirty plus seventy. Resting energy requirements (RER) in the geriatric pet population have sparked significant controversy amongst authors. It is widely believed that RER are reduced by 25% in canines over 7 years of age. As such, commercial brand dog foods have made products with higher digestible fibers to reduce caloric intake in these patients, to maintain a lower metabolic energy requirement. Animals fed above their RER will result in obesity. RER changes in aging cats have been highly controversial. It is suspected that cats between the ages of 7–11 years have a similar decline in their RER to dogs. However, most authors believe that as cats age ***between 11–13 years their RER increases***, resulting in more geriatric cats that have unexplained reduction in weight. One reason for this is that unlike their dog counterpart, geriatric felines continue an active lifestyle longer, associated with their lighter body weight and consistency in their environment (i.e. dog activity is often reflective of their owner activity). It has been further hypothesized that this weight loss, contributes negatively to morbidity and mortality. Therefore when tailoring a nutritional plan, it is important to keep these things in mind.

Page Yaxley, DVM, DACVECC
Mich Vet Conf, 01:14

Benefit of long-term NSAIDs

There's a fear among practitioners and pet owners that the longer NSAIDs are used, the risk of something bad happening increases. The authors have found that was not true; there was no association between the longer you give a non-steroidal and the risk of side effects. The authors have found no relationship between these two things — length of non-steroidal use and incidence of side effects. Most side effects that do occur appear within 2-4 weeks. Often, the clinical approach to a young or middle-aged dog with OA-associated pain is to avoid the use of NSAIDs. The rationale often quoted for this approach is that the practitioner wants to "save the use of NSAIDs for later, and not have a dog on NSAIDs for the whole of its life." This is a flawed and rather naive approach. Anecdotally, most practitioners will know that G.I. effects are rare with the newer NSAIDs, however use should be

discontinued if intermittent G.I. signs are present.

B. Duncan X. Lascelles, BSc, BVSc, DECVS, DACVS
Vet Pract News, 27:7

Taurine and cardiomyopathy

Taurine has found a role in the treatment of dilated cardiomyopathy in certain breeds of dogs. In clinical practice, the author has seen American Cocker Spaniels with dilated cardiomyopathy that have responded to taurine supplementation alone. However, others have required the addition of L-carnitine before their condition was controlled. Urine, plasma, and whole blood taurine concentrations can be measured. Whole blood levels are a more reliable index of long term taurine status than are plasma concentrations. Taurine concentrations can be measured at: Amino Acid Laboratory, U Cal Davis (www.vetmed.ucdavis.edu/vmb/aal/). Recommendations for taurine supplementation in dilated cardiomyopathy are as follows: *All American Cocker Spaniels. *Consider in animals with dilated cardiomyopathy and cysteine or urate urolithiasis (e.g., English Bulldogs and Dalmatians). * Consider in Golden Retrievers, Newfoundland Dogs, Portuguese Water Dogs and any atypical breeds for dilated cardiomyopathy. The suggested taurine dose for dogs with dilated cardiomyopathy is 1/2-1 g, PO, q8–12h for dogs weighing under 25 kg and 1-2 g, PO, q8-12h for dogs weighing >25 kg.

Francis W.K. Smith Jr., DVM, DACVIM
West Vet Conf, 02:14

Substituting serum for colostrum

Early immunologic protection is provided by maternal antibody delivered via colostrum suckled during the first hours of life. Pups and kittens that fail to nurse colostrum are at significant risk for early infection. The SC administration of serum from the mother or some other healthy, well-vaccinated cat or dog can, in part, make up for a lack of colostrum. The general empirical dose for kittens is 15 mL of serum, dosed as 5-mL SC boluses at birth, at 12 hours, and at 24 hours. In puppies, the empirical dose is 22 mL/kg of pooled adult serum; this can be given as split boluses similar to kittens or as one large dose.

Justine A. Lee, DVM and Leah A. Cohn, DVM
NAVC Clin Brf, 13:2

Balanced home-made elimination diet

For Dogs: 5 lbs cooked potatoes, sweet potatoes, or rutabagas; 1 lb cooked venison, ostrich, emu, rabbit, or duck; 1 teaspoon dicalcium phosphate (www.arcatapet.com, Item 13230); 5 tablespoons safflower oil (Hollywood brand only; www.hollywoodoils.com); 1 teaspoon salt substitute (potassium chloride); 2 tablets of Nature Made Multi Complete Multiple Vitamin/Mineral Supplement with Iron. Feeding Guidelines: * Toy breeds (4-12 lbs): 1/3-2/3 lbs of food/day. * Small breeds (12-20 lbs): 2/3-1 lb of food/day. * Medium breeds (20-50 lbs): 1-2 lbs of food/day. * Large breeds (50-80 lbs): 2-3 lbs of food/day. **For Cats**: 1/2 lb cooked potatoes, rice, or green peas; 1 lb cooked lamb, venison, ostrich, emu, rabbit, or duck; 1 teaspoon dicalcium phosphate; 1/2 tablespoon safflower oil (Hollywood brand only); 2 teaspoons light salt; 2 tablets of Nature Made Multi Complete Multiple Vitamin/Mineral Supplement with Iron; 350 mg taurine.

Edmond J. Rosser Jr., DVM, DACVD
83rd AAHA Conf, Apr 2016

Feeding the pancreatitis dog

Nothing per os (NPO) has been the classic therapy for pancreatitis for many years. While it is true that they feed people with pancreatitis earlier than we feed dogs, you must remember that human pancreatitis is unassociated with dietary fat. People get pancreatitis from alcohol, trauma, gall stones and multiple organ failure. Canine pancreatitis is associated with dietary fat (as well as surgical trauma when poor technique is used around the pancreas). Some preliminary research suggests that it is safe and perhaps beneficial to feed dogs with acute pancreatitis PO or with an esophagoscopy tube as soon as they can tolerate it (i.e., they do not get worse, even if they are still vomiting). This author recommends that a) you feed as low a fat content as possible, and b) if the feeding is associated with worsening of the vomiting, that you stop it and either try again in a day or two, or go to jejunostomy feeding. Do not try to get full caloric intake into the patient; rather, start with small amounts to see if the patient will hold down the food. Obviously, if feeding is associated with worsening of the vomiting or general condition, stop the feeding. The author generally starts feeding potato or rice (i.e., no fat) and gradually work the way up to commercial diets with low fat content.

Michael D. Willard, DVM, DACVIM-SA
Mich Vet Conf, 02:15

Spironolactone use in heart failure

The aldosterone antagonist, spironolactone, has received renewed interest with a report that life expectancy was prolonged in humans with heart failure when spironolactone was administered concurrently with conventional therapy in NYHA phase IV patients. Because spironolactone is a weak diuretic, particularly at the modest dosage used in this study, the investigators concluded that benefits were due to blunting the adverse effects of aldosterone ("aldosterone breakthrough"). Spironolactone has now been shown to give similar results in canine heart failure. Spironolactone or related drugs (mineralocorticoid receptor blockers) are now commonly used in heart failure in both dogs and man. This drug might logically be used early in heart failure for this reason, but there is not data for early or pre-heart failure states. In the author's laboratory, an experimental model of RAAS activation, has shown that aldosterone breakthrough occurs in dogs and it occurs relatively early in the course of enalapril and benazepril use. It is logical

and supported by data, that ***spironolactone should be used concurrently with ACE-I***, regardless of the stage of heart disease. A combination product (benazepril and spironolactone) has been recently approved for use in dogs in the EU. Lastly, the use of an ACE-1 and spironolactone has been shown to be safe and with uncommon increases in serum potassium concentrations.

Clarke Atkins, DVM, DACVIM
100th WI VMA Conf

Treating nausea of CKD

Gastrointestinal symptoms in CKD cats may not necessarily be the result of gastric lesions, but perhaps the consequence of circulating uremic toxins interacting with the chemoreceptor trigger zone in the brain. Medical management of gastrointestinal symptoms with antiemetic and anti-nausea drugs may therefore be more appropriate (Grade 4). Several anti-nausea therapies are available. These include maropitant, ondansetron and dolasetron. These drugs work at the nausea center in the brain as well as in gut and can be given as an injection. Ondansetron has been documented to be helpful in human patients suffering from uremia. However recent pharmacokinetic studies in cats have demonstrated that oral bioavailability of ondansetron (0.5 mg/kg) is poor in cats (~35%) and the half-life is very short (approximately 1 hour) making it a q 8hr medication. Subcutaneous ondansetron has a slightly longer half-life of 3 hours. In addition to its appetite-stimulating properties, mirtazapine demonstrates anti-nausea properties as it acts at the 5HT3 receptor similarly to ondansetron and dolasetron (Grade 4). A recent study assessed the efficacy of Cerenia for management of chronic vomiting and inappetence associated with feline CKD (Grade I). When given orally (4 mg) daily for two weeks, Cerenia was demonstrated to palliate vomiting associated with chronic kidney disease, however did not appear to significantly improve appetite or result in weight gain in cats with Stage II and III CKD. A pharmacokinetic and toxicity study in cats indicated that ***longer-term usage appears safe***.

Jessica Quimby, DVM, PhD, DACVIM
ACVIM Conf, 06:15

Recurrent heart failure

Recurrent heart failure (HF) is a new instance of HF signs in a patient previously stable on therapy, and may include the same signs as previously seen or new manifestations of HF. A previously balanced congestive HF patient may be presented with client complaints of weakness, lethargy, generally doing poorly or a sudden deterioration of clinical condition. Important client "comments: …"he hasn't been eating but he has been getting ALL of his medications…" The most common cause of this presentation in a chronic HF patient on medications is ***hypotension due to dehydration***. This may occur due to an unexpected lack of access to water (new living situation) or because some problem has prevented the animal from accessing available water (e.g. blindness, orthopedic problems). A frequent contributing factor to dehydration is lack of appetite, which may be drug-related (e.g. toxic concentrations or idiosyncratic reaction) or drug effect-related (i.e. prerenal azotemia due to diuretic therapy). Vomiting or diarrhea from any cause exacerbates dehydration. Diuretic and vasodilator administration in a dehydrated animal leads to rapidly symptomatic dehydration and hypotension.

Rebecca L. Stepien DVM, MS, DACVIM
West Vet Conf, 02:14

Normal dog, abnormal ALT and ALP

If no likely explanation for the laboratory abnormalities can be found, there are two courses of action that one can take: either begin a diagnostic evaluation of the patient, starting with bile acid determinations, or reevaluate the patient's liver enzymes at a later date. A reasonable waiting period for revaluation, in the author's opinion, is 4-6 weeks, given what is known about the half-life of liver enzymes and the time needed for liver recovery from an acute occult hepatic injury. It is best not to delay retesting beyond 6 weeks, however, in the event that an active disease process is present. During the waiting period, one may consider a trial therapy of antibiotics or liver support. Liver support therapy would include antioxidants such as S-Adenosyl methionine (SAMe) or milk thistle (silibin) therapy. Identification of persistent abnormal liver enzymes or abnormal liver enzymes and abnormal bile acid concentrations should dictate further hepatic investigation.

David C. Tweedt, DVM, DACVIM
81st AAHA Conf

Treatment of chronic proliferative otitis

1) Systemic glucocorticoid (e.g. starting at 1-2 mg/kg/day prednisolone/prednisone for two weeks, then .05-1 mg/kg, for two weeks, then 1 mg/kg, every other day for two weeks, then 1.0 - 1.5 mg/kg, every other day for two weeks, and gradually taper). Systemic glucocorticoid therapy is generally maintained until proliferative changes have been significantly reduced. Note: the first 3-4 weeks of an aggressive oral and topical glucocorticoid regimen is a very important "test" of the potential reversibility of proliferative changes. If severe stenosis persists, then the prognosis for the medical management of the otitis is very poor. 2. Systemic antibiotic (if bacteria present cytologically) - chosen on the basis of cytology initially – cephalexin, cefpodoxime or Clavamox for cocci, marbofloxacin for rods; for pleomorphic populations of bacteria (cocci and variably sized rods, Clavamox); then based on bacterial culture and sensitivity testing.

Rod A.W. Rosychuk, DVM, and Howard Seim, III, DVM
West Vet Conf, 02:14