C/E for the one who doesn't have time for C/E

"Pearls" of Veterinary Medicine

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Key points in treating GI disease

1) Cobalamin is not only of diagnostic, but also of therapeutic importance, and dogs and cats with chronic diarrhea and cobalamin deficiency may not respond to appropriate therapy ***if cobalamin is not being supplemented at the same time***. 2) Dietary trials are very valuable as a diagnostic and management tool in dogs and cats with chronic diarrhea and some estimates suggest that approximately 50% of dogs and cats with chronic diarrhea respond to such a dietary trial; a dietary trial needs to be exclusive. 3) The intestinal microbiota can be altered by the use of prebiotics, probiotics, and/or antibiotics; probiotics must be safe, stable, and efficacious. 4) Tylosin at 25 mg/kg, q12h is the antibiotic of choice for dogs and cats with chronic diarrhea that are being suspected of having small intestinal dysbiosis.

Jörg M. Steiner, Dr.med.vet., PhD, Dipl. ACVIM, ECVIM-CA
West Vet Conf, 02:13

Atopy and steroids

This author tries to avoid using glucocorticoids for long-term management of atopy if possible, but using prednisone or prednisolone in short bursts and getting dogs to low-dose alternate day therapy is necessary for some dogs during the induction phase of immunotherapy. Recent evidence suggest that steroids may actually enhance the induction of T regulatory cells, one of the mechanisms by which immunotherapy is supposed to work. Therefore ***steroids are NOT contraindicated in dogs on immunotherapy***.

Valorie A. Fadok, DVM, PhD, Dip ACVD
82nd AAHA Conf

Tyrosine as a training aid

Certain canine behaviors (e.g., easy distraction, low attention span) can resemble those of children with ADHD. Catecholamine levels (which might be correlated with ADHD) and training ease were examined in 3 dog breeds (German Shepherd, Labrador Retrievers, Toy Poodles) given oral tyrosine, which can increase catecholamine levels in the brain. Peripheral catecholamine levels were seemingly unchanged after daily oral tyrosine administration; however, the number of successful reactions to commands and reaction times to unknown stimuli in the shepherd dogs and ***retrievers improved significantly***, suggesting the potential importance of neuronal catecholamine for appropriate attention levels.

M. Kano et al.
Plumb's Ther Brf, May 2015

Valuable Information Inside

Ovulation timing

When should progesterone be tested for ovulation timing? Breeder clients should be advised to notify the clinic when they first notice vulvar swelling, vaginal discharge, or attraction to males in a bitch for which breeding is planned. Early proestrus should be documented by vaginal cytology (<50% cornified [superficial cells]). Vaginal cytology should be performed every 2 to 4 days until a significant progression in cornification is seen, usually above 70% superficial cells. At that point, serial hormonal assaying should begin. At the end of the fertile period, vaginal cytology undergoes the diestrual shift, which signifies the first day of diestrus. Breeding after the diestrual shift is rarely successful.

Autumn P. Davidson, DVM, MS, Dip ACVIM
NAVC Clin Brf, May 2015

Extralabel use of clindamycin

Anecdotally, injectable formulation marketed for humans has been used in dogs and cats. Generally used for patients that cannot be medicated orally or when GI disease may limit oral absorption. Parenteral dosing is similar to PO formulation because of high bioavailability by all routes studied. Dogs: Bioavailability at least 87% after IM administration and 73% after PO administration. Rapid IV injection of undiluted clindamycin has been associated with cardiac arrest and hypotension in humans, so dilution and slow IV administration is advised in animals.

Melissa Clark, DVM, PhD, Dip ACVCP
Plumb's Ther Brf, May 2015

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Evaluating topical medications

A recent literature review was published in which the authors evaluated the 9 in vitro and 21 in vivo studies on topical antimicrobial treatment of skin infections. Recommendations were made based on quality assessment of the studies and categories of evidence for efficacy. Known reported adverse events were also considered when formulating the final recommendations. The authors concluded that there is: 1) Good evidence to recommend 2%-3% chlorhexidine against bacteria. 2) Good evidence to recommend 2% chlorhexidine - 2% miconazole against bacteria and Malassezia. 3) Lesser evidence to recommend 2%-3% benzoyl peroxide against bacteria and yeast. 4) Conflicting evidence on the efficacy of ethyl lactate. 5) Insufficient evidence to recommend any other topical therapy for cutaneous infections.

Kenneth W. Kwochka, DVM, Dip ACVD
Music City Vet Conf 02:14

Xylitol in chewing gum

The toxicity of xylitol is dose-dependent. The dose necessary to cause hypoglycemia in dogs is approximately 0.1 grams/kg, while the amount needed to cause hepatic necrosis is approximately 0.5 grams/kg. Most chewing gums and breath mints typically contain 0.22 to 1.0 gram of xylitol per piece of gum or per mint. Therefore ***only one piece of gum may result in hypoglycemia*** in a 10-pound (4.5-kg) dog. Hypoglycemia is typically evident within 1-2 hours of xylitol ingestion but in rare cases has been delayed as much as 12 hours. Prompt decontamination via the induction of emesis in asymptomatic patients with euglycemia is essential to prevent poisoning. Activated charcoal does not bind well to xylitol and is not typically necessary or recommended. Should hypoglycemia develop, supplementation with intravenous dextrose is needed until the dog can self-regulate its blood glucose concentrations. For dogs exposed to hepatotoxic doses of xylitol, preemptive administration of dextrose (prior to the onset of hypoglycemia) may be helpful. Additionally, close monitoring of hepatic enzymes is warranted as evidence of necrosis may be seen 1-2 days following exposure. Should hepatic necrosis develop, IV fluids, dextrose, hepato-protectants and monitoring of coagulation profiles are needed.

Ahna Brutlag, DVM, MS
Vet Med, 109:4

Using KBr for seizures

Potassium bromide is becoming the drug of first choice for the management of epilepsy in dogs because it is the only anticonvulsant known that has no hepatic toxicity and all of its adverse effects are completely reversible once the drug is discontinued. KBr controls approximately 80% of the epileptic dogs it is used to treat and is often effective in dogs that fail phenobarbital (PB) therapy. When high-dose KBr and low-dose PB are used together, approximately 95% of epileptic dogs can be controlled. The maintenance dosage of KBr is 20-100 mg/kg/day (which can be divided BID to avoid GI upsets) to achieve serum concentration of 1-5 mg/ml measured just before the next dose is administered. It requires 2-3 weeks of therapy before the bromide serum concentration will enter the therapeutic range and close to 4 months before steady-state values are approximated. If seizure control is needed more rapidly than this, a total oral loading dose of 400-600 mg/kg of potassium bromide can be given prior to instituting the maintenance dosage schedule, divided QID over 4-5 days. When the loading dose is divided, excessive sedation may be avoided in case the dog is especially sensitive to the sedative effects of bromide. The loading dosage should be mixed well with food to avoid the induction of vomiting. Be sure to stress to owners that it is important to keep the salt content of the diet consistent to prevent marked serum concentration fluctuations of bromide. The most common adverse effect of bromide therapy is polyphagia, and it is recognized in about 25% of the dogs on therapy, necessitating changing to a low-calorie diet such as canine R/D or W/D to prevent excessive weight gain.

Simon Platt, BVM&S, MRCVS, Dip ACVIM, Dip ECVN
81st AAHA Conf

Sedation in the rabbit

Rabbits commonly present with rhinitis due to a number of agents, primarily bacterial. The rabbit is an obligate nasal breather; therefore any space occupying disease of the nasal cavity (fluid, pus, caseous material, necrotic bone) can produce severe dyspnea and even cause death. Rabbits with bacterial rhinitis can present with varying degrees of respiratory symptoms: from sneezing, and/or mild nasal discharge to severe purulent nasal exudate and dyspnea. Rabbits in severe respiratory distress due to rhinitis can respond to administration of parenteral antibiotics and nebulization of mucolytic agents, saline, and antibiotics. However, a few will not respond prior to asphyxia. For these severe cases, nasal flush and/or emergency rhinotomy may be indicated. The rabbit in severe respiratory distress benefits from administration of ***low dose sedation*** in order to reduce anxiety and continued diagnostics and treatment. Administer agents combined into a single syringe intramuscularly to minimize stress and handling. The author recommends the following: Midazolam: 0.25-0.5 mg/kg; Butorphanol: 0.2-0.3 mg/kg

Angela M. Lennox, DVM, Dip ABVP
19th Int VECCS Conf

Dakin's solution for topical therapy

After shampoo therapy, the skin is hydrated, the hair follicles are open. This is the ideal time to lock in hydration, clobber any remaining bacteria, or apply a product with residual antimicrobial action. In the case of MRSP, one of this author's favorite rinses is Dakin's Solution. Dakin's solution is a 0.5% sodium hypochlorite solution that was produced for wound therapy during World War I, prior to the advent of penicillin. Now that we are once again dealing with *Staphylococcus* with limited susceptibility to routine, safe, efficacious

antibiotics, Dakin's solution has re-emerged as an effective topical therapy for MRSA and MRSP pyoderma. Dakin's solution in full or half strength can be purchased premade or can be made easily at home by combining three common household ingredients: water (32 ounces), 5.25% bleach (3 ounces), and baking soda (1/2 teaspoon). Since organic debris greatly inhibits the action of Dakin's solution, it is used after bathing or on otherwise clean skin. Generally the author prefers half-strength solution, using the above formula with only 1.5 ounces of 5.25% bleach. Owners should apply with a sponge after a bath, soak to the skin until thoroughly wet, do not rinse. Because bleach can discolor fabrics, advise owners to wear clothes they would paint in, apply outside, and take dogs for walks until dry. The solution can also be placed in a spray bottle to apply to focal areas in between baths. White dogs can get an orange discoloration to the fur.

John C. Angus, DVM, DipACVD
N Amer Vet Conf, 01:14

Chronic hepatitis, management

It is first important to rule out both infectious disease (leptospirosis) and copper associated liver disease. The copper associated conditions are treated with chelators, low copper diets and possibly zinc to block copper absorption from the GI tract. Without an etiology and significant inflammation and necrosis this author uses anti-inflammatory therapy. The traditional therapy is to use corticosteroids. The problems with steroids are the side effects, the steroid hepatopathy and the inability to know if the dog is responding short of a liver biopsy. The author has more recently been using cyclosporine with good success and can easily document improvement of liver enzymes. Initial dose has been 5 mg/kg, BID. Other therapy may include ursodeoxycholic acid and liver support medications.

David C. Twedt, DVM, Dip ACVIM
60th HI VMA Conf

Onions, garlic, chives toxicity

The plants that belong to the Alliaceae family (e.g., onions, garlic, chives, and leeks) contain propyl disulfides and thiosulfates. When metabolized, these toxic compounds cause oxygen free radicals, denatured hemoglobin (e.g., Heinz body anemia), and methemoglobinemia. Multiple factors contribute to the level of toxicity, including its state (e.g., dried, juiced, powdered, fresh, cooked, etc.), species affected, species of plant, time of year, and duration of exposure (e.g., acute versus chronic). Typically, ingestions >0.5% of the animal's body weight warrant decontamination. Cats are at high risk for toxicosis due to their hemoglobin differences (which contain eight sulfhydryl groups as compared to dogs who have four). Likewise, certain dog breeds (e.g., Akita, Shiba Inu, Jindo) with reduced potassium and glutathione concentrations are at higher risk for oxidative damage. Clinical signs are often delayed, and ***may take days to weeks to unmask*** (depending on the chronicity of toxicosis). Clinical signs and clinicopathologic changes include lethargy, tachycardia, pallor, GI signs, Heinz body anemia, pigmenturia, methemoglobinemia, eccentrocytosis, etc. Treatment includes decontamination, antiemetics, fluid therapy, gastric protectants, and hematology monitoring.

Justine A. Lee, DVM, Dip ACVECC
81st AAHA Conf

Hyperthyroidism and kidney disease

.Because it is not always possible to predict which hyperthyroid cats have underlying CKD, this has led to the recommendation that trial treatment with methimazole (or carbimazole) be performed prior to definitive therapy with radioactive iodine. There are a couple of important implications that result from this recommendation: 1) if azotemia develops following medical treatment, then it would be best to subsequently leave the hyperthyroidism untreated (or at least under-treat it) to maximize renal function; 2) if the cat develops azotemia, the client should then be counseled against having definitive therapy for their cat's hyperthyroidism due to a poor long-term prognosis. However, evidence exists to suggest that ***both these conjectures are misguided***. Mild to moderate kidney disease alone should never preclude permanent treatment of hyperthyroidism. Recent research provides evidence that hyperthyroidism may contribute to the development or progression of CKD in cats, suggesting that leaving a hyperthyroid cat untreated (or poorly regulated with methimazole) may be detrimental to long-term kidney function. Treating and curing hyperthyroidism may help to both reverse renal damage and preserve the remaining kidney function. Secondly, in most cats that develop newly diagnosed azotemia following treatment for hyperthyroidism, the degree of CKD is mild (usually IRIS stage 2) and associated with few, if any, clinical signs other than mild polyuria/polydipsia. The survival time of cats that develop azotemia following treatment of hyperthyroidism is not significantly different from those that do not, unless they develop hypothyroidism. This finding may be surprising to practitioners who will tend to assume that the development of azotemia is associated with a worse prognosis. However, CKD is relatively slowly progressive in cats, and only about half of all cats diagnosed with mild CKD will ultimately succumb to the disease, with many dying due to other causes.

Mark Peterson, DVM, Dip ACVIM
AAFP Conf, 09:14

Calcitriol dosing

Intermittent rather than daily dosing treatment protocols are likely to become the standard of care since less hypercalcemia occurs during this protocol. The equivalent dose given at 2.5 ng/kg daily is given instead every 3.5 days. This works out to a dose of 9 ng/kg (8.75 ng/kg rounded to 9 ng/kg). It is important to give the dose every 3.5 days, rather than on day 1 & 4. For example if a dose is given Tuesday PM the next dose should be given Saturday AM. This is the longest time in between dosing that

will still suppress the parathyroid gland. This method of dosing is especially attractive for cat owners since medication will only be given twice weekly.

Dennis J. chew, DVM, Dip ACVIM
VA VMA Conf, 02:15

Pimobendan for heart disease

Giving pimobendan before onset of signs can delay progression of heart disease and ***prolong overall life*** in Doberman Pinchers with occult DCM but without significant ventricular arrhythmias. The median survival time of Dobermans receiving pimobendan (vs placebo) increased by 15 months. Pimobendan administration did not increase the frequency or complexity of ventricular arrhythmias determined by pre- and post-treatment Holler monitors. Although this news is exciting, we should continue to use caution administering pimobendan in other breeds with occult DCM and those preclinical DCM dogs that have significant ventricular arrhythmias.

Teresa DeFrancesco, DVM, Dip ACVIM, Dip ACVECC
NAVC Clin Brf, 12:3

Using ketoconazole with cyclosporine

Ketoconazole is a cytochrome P450 inhibitor, and can decrease the clearance of many drugs. This effect can be used to a therapeutic advantage with cyclosporine, which is a cyclic peptide produced by the fungus *Beauveria nivea* and is used to treat a variety of immune-mediated disorders. Administration of ketoconazole with cyclosporine will decrease the degradation of cyclosporine and increase its efficacy. This has primarily a financial advantage, as cyclosporine is often prohibitively expensive. Doses used for this protocol are: Cyclosporine: 4-5 mg/kg/day; Ketoconazole: 10 mg/kg/day. Cyclosporine serum levels should be evaluated at steady-state (about 1 week). The target level is 500 ng/mL until clinical remission is noted; 200 ng/mL will likely maintain remission.

Tony Johnson, DVM, Dip ACVECC
N Amer Vet Conf, Vol 29, 2015

Benefits of spironolactone in heart disease

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 a human study. 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, or MRBs) are now commonly used in heart failure in both dogs and humans. This drug might logically be used early in heart failure for this reason, but there is no data for early or pre-heart-failure states. There is tangential information in that eplerenone, a similar drug, has been shown to be effective if used in mild heart failure in people. 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 ACEI therapy***, regardless of the stage of heart disease. The use of an ACEI and spironolactone has been shown to be safe and with uncommon increases in serum potassium concentrations.

Clarke Atkins, DVM, dip ACVIM
81st AAHA Conf

Do cats require "meat"?

Because cats are carnivores and evolved consuming prey, there is a perception that they cannot utilize vegetable sources of nutrients in their diet. This is not correct. ***Cats do not have a specific requirement for animal tissues***, just for the nutrients that may be present in those tissues. When the focus is on the nutrients and not the source of those nutrients, it becomes clear that alternate sources can be used to meet the nutritional requirements of cats. Cats are easily able to digest and metabolize amino acids and other essential nutrients from vegetable sources, such as from soy protein or corn gluten meal (a concentrated source of corn protein). Neither of these vegetable protein sources alone would meet the needs of cats, but they can contribute to a balanced diet when used in conjunction with complementary protein sources and other ingredients.

Dorothy P. Laflamme, MS, DVM, PhD, Dipl. ACVN
West Vet Conf, 02:13

Demodicosis, don't forget the feet

One of the most forgotten and undiagnosed foot problems is *Demodex* species infection of the feet, or demodectic pododerma-titis. Demodicosis is one of the most common reasons for recurrent yeast or bacterial pododermatitis, yet it's frequently missed. Instead, if yeast or bacteria are found on skin smears, a skin scraping is often neglected. Don't stop at just performing cytology of the feet and nail beds—be sure to do deep skin scrapings of the affected areas. Sometimes the initial presentation is with just one foot affected. The author had patients that have always favored one foot since very young and were never checked for demodicosis—it was assumed they were allergic since they licked the foot. Years later, this can grow into generalized demodicosis if corticosteroids continue to be prescribed because it is thought that the patient is allergic. Be sure to rule out demodicosis before starting *any* steroid, as they will reduce the inflammation but incite the demodicosis even more. Remember, not all dogs that lick their feet are allergic.

Alice M. Jeromin, DVM, Dip ACVD
DVM News Mag, Jun 2015