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

"Pearls" of Veterinary Medicine

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Annual vaccination not necessary

If a dog is to be immunized against canine parvovirus, it needs a modified-live vaccine at 8 weeks, 12 weeks and 16 weeks of age, followed by a single dose not later than one year following the last dose in the initial series. For the canine population at large, ***annual vaccination*** for distemper, parvovirus and adenovirus-2 is, in a word, ***unnecessary***. What has actually been happening for many years is administering vaccines to healthy, previously vaccinated dogs that already have protective levels of circulating antibody to each of these viruses. Administering more vaccine annually simply culminates in vaccine interference by existing antibody, in the same way maternal antibody interferes. 'Boosting' titers, which by definition means a fourfold increase in titer, seldom occurs when administering core vaccines annually. Robust immune "memory"-not just antibody-results from administration of the initial vaccine series. That "memory" to the antigens persists for at least 7 years, and may even last for the patient's lifetime. Even if antibody levels do decline, memory is still present, working in the background. If the seronegative, previously vaccinated patient is exposed to, say, parvovirus, the memory cells (B lymphocytes) immediately begin producing antibody, in essence, boosting the patient's immunity. That's why we don't see older dogs with distemper, parvovirus or viral hepatitis (adenovirus), even among unvaccinated populations. Dogs who have lived long enough to be considered "geriatric" have likely either been previously vaccinated or have been infected and therefore immunized.

Lou Anne Epperley,
Vet Pract News, 25:12

Valueable Information Inside

Association of type of diet and kidney disease in cats

In this study of 1200 cats it was found that median weight loss in the preceding 6-12 months was 10.8% and 2.1% among the chronic kidney disease (CKD) and control cats, respectively, and was associated with a diagnosis of CKD. Interestingly, there appeared to be ***no association between type of diet*** (wet or dry) and the development of CKD despite the belief that a dry diet is more taxing on the kidneys.

J.P. Greene, et al.
Vet Med, Nov 2014

Metronomic chemotherapy

Chemotherapy involves administration of cytotoxic drugs at the maximum tolerated dose (MTD) to inhibit or kill rapidly dividing tumor cells with the least amount of adverse effects. Limitations include toxicoses, potential lack of effectiveness, development of resistance, and considerable expertise and expense involved. Recent studies and anecdotal evidence suggest chemotherapy at doses ***considerably lower than the MTD*** for several months or more, or ***metronomic therapy***, could be beneficial. In this study, 36 dogs with various cancers were given chlorambucil at 4 mg/m2, PO, q24h. Toxicoses were uncommon and limited to GI signs in 4 dogs (resolution achieved with supportive care). Three dogs (with mast cell tumor, soft tissue sarcoma, and thyroid carcinoma) showed complete remission. Tumor response was similar in other patients, with median progression-free interval of 61 days and median survival time of 153 days for all dogs. Even when disease progressed, progression was slower than it was before chlorambucil administration. Cancer control was achieved in dogs that had previously failed other therapies, including traditional chemotherapy given at MTD. Results suggest chlorambucil may be an effective drug for metronomic therapy in dogs with cancer. Future studies should include cohorts by cancer type and drug dose to further ascertain metronomic therapy protocols.

T.N. Leach et al.
NAVC Clin Brf, 11:11

Eliminating hyperthermia in anesthetized cats

It is true that most opioids can cause hyperthermia in cats. A recent study has shown a strong association of hyperthermia with hydromorphone, especially when

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ketamine is used concurrently. The author's solution: Administer a microdose of medetomidine (1 µg/kg) postoperatively in cats that have received hydromorphone and ketamine.

Ann Weil, DVM, Dip ACVAA
Vet Med, Oct 2014

Levetiracetam (Keppra) for seizures

Starting dose is usually 15-20 mg/kg, PO, TID. The author escalates to around 50-60 mg/kg, TID. Concurrent phenobarbital may necessitate higher dose. No known organ toxicities, and the only partial contraindication is kidney disease. Sedation (even ataxia and paresis): negligible or resolving (occasionally persistent). Extended release levetiracetam has recently become available. Studies in laboratory dogs support its use in dogs (its clinical use has not been reported). The same total daily dose can be given, divided into 2 doses (e.g. substitute 30 mg/kg, BID of Keppra XR for 20 mg/kg regular Keppra TID). As the extended release version of this drug has not yet been clinically studied, this author uses regular Keppra TID when owners are able to give medications every 8 hours, but does utilize XR Keppra BID for owners who cannot perform TID dosing. Good levels appear to be in the range of: >5 trough (immediately before next dose is due) Around 40 peak (2 hr post-pill). However, some well-controlled patients have very low trough and we don't yet have a feel for the fine details of level interpretation. Ultimately, without performing levels in many patients the dose is increased as required, with persisting sedation or ataxia/paresis as the dose-limiting factors. Typically, this author performs chemistry panels on any patient being treated for seizures every 6-12 months, but other than this no laboratory work or serum levels are performed to monitor Keppra. Loading doses are not necessary: first oral maintenance dose achieves therapeutic level in under 30 minutes.

R. Timothy Bentley, BVSc (Dist), MRCVS, Dip ACVIM
20th Int VECCS Symp, Sep 2014

Finding that undescended testicle

The location of undescended testicle(s) determines the surgical approach for a cryptorchid dog or cat. A subcutaneous testicle can be removed by incising directly over the testicle. Anatomic guides can simplify locating an abdominal testicle. Because the ductus deferens enters the urethra at the prostate, tracing the ductus deferens on the cryptorchid side from the prostatic urethra cranially to the point where it runs dorsal to the bladder (passing the junction of the ureter and the bladder) and turns laterally will lead to the abdominal testicle. A caudal abdominal skin incision can be made lateral to the prepuce (in dogs; midline in cats) on the cryptorchid side before passing a spay hook from medial to lateral, lateral to the bladder wall, to catch the ductus deferens. Alternatively, the bladder can be reflected caudally to allow visualization of both ductus deferens. When the testicle is in the inguinal canal, a hemostat can be used to tease away the musculature of the internal inguinal ring and deliver the testicle back into the abdomen for excision. If a suspected abdominal testicle was not found, the patient may have an undiagnosed subcutaneous cryptorchid testicle. The skin should be undermined between the abdominal incision and the external inguinal ring to reach the testicle. Gentle traction on the abdominal ductus may reveal location of the ductus deferens as it exits the inguinal canal.

P.A. Bushby
NAVC Clin Brf, 11:11

Keeping the skin clean in atopic dogs

Atopic dogs should be wiped down with a damp cloth or baby wipe (paws, legs, underside) after walking outside to remove sticky pollen grains and mold from the skin and hair coat, which can be transcutaneously absorbed to worsen the allergic response. Other ways to prevent allergen over-absorption and self-trauma include the use of ***protective dog body suits*** (designerdogwear.com, K9topcoat.com). These lightweight protective suits can be worn daily and washed frequently, and do seem to help some dogs.

Helen T. Power, DVM, Dip ACVD
60th HI VMA Conf

Detecting uroabdomen

Contrast studies are helpful to confirm uroabdomen. Approximately 10 ml/kg of contrast agent can be used to infuse the bladder. If the patient is female and urethral catheterization is difficult, a ***vaginourethrogram*** can be performed. With heavy sedation or anesthesia, a large balloon-tipped catheter is inserted into the vagina rather than the urethra and the balloon is inflated to prevent loss of contrast medium. The contrast is injected through the catheter and will fill the vagina initially until a noticeable amount of resistance is met during the injection as the contrast refluxes into the urethra and into the bladder.

Phil Zeltzman, DVM, Dip ACVS
Vet Pract News, Oct 2014

OTC prescription diets, beware

The best way to make a diagnosis of cutaneous adverse reactions to foods is by feeding a **prescription** single protein limited ingredient test diet or a **prescription** diet containing protein hydrolysates, and subsequent challenge with the patient's original diet. **Prescription** is **highlighted** because a recent study determined that three out of four venison OTC therapeutic diets for food allergy contain undisclosed soy, beef, and/or poultry protein.

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

Moldy food poisoning

Accidental poisoning can occur when compost or moldy food (from a garbage can) is ingested, due to the presence of tremorgenic mycotoxins. Common

food sources include moldy nuts (e.g., walnuts), starch sources (e.g., pasta, bread), cheese, nuts, or other decaying matter. This is a common toxicant in free-roaming dogs. Clinical signs include GI signs (e.g., hypersalivation, vomiting, diarrhea, distended abdomen) and CNS signs (e.g., agitation, hyperesthesia, ataxia, muscle tremors, seizures, and secondary hyperthermia). Metabolic acidosis may occur, and disseminated intravascular coagulation may be seen due to persistent tremors and severe hyperthermia. Clinical signs can be seen acutely within a few minutes to hours, with most occurring within 2-4 hours of ingestion. Treatment includes decontamination, if appropriate. Ideally, gastric lavage should be performed in symptomatic patients to allow for appropriate decontamination while protecting the airway with an inflated endotracheal tube. A single dose of activated charcoal should be given (ideally via orogastric tube following gavage). Treatment is symptomatic, and supportive care is recommended, including injectable methocarbamol for tremors (22-110 mg/kg, IV, slow to effect), antiemetics (e.g., maropitant, 1 mg/kg, SQ, q24h), anticonvulsants for seizures (e.g., phenobarbital, diazepam), and IV fluids to aid in cooling the patient and protect the kidneys from acute renal failure secondary to myoglobinuria (rare) from severe tremors and seizures.

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

Chemotherapy for mast cell tumor

Additional therapy (chemotherapy, tyrosine kinase inhibitor (TKI) therapy) needs to be considered in dogs with poor prognostic indicators (e.g., grade III, high mitotic index, poor location) after complete excision of the MCT. Dogs with nonexcisable tumors may also be considered for chemotherapy or TKI therapy; both of these therapies show better success against smaller tumors, but certainly can be beneficial in cases with bulky tumors. Palladia (toceranib phosphate: Zoetis) is a fully approved TKI. Recently, a study demonstrated equal efficacy with a lower dose than on the label; thus, it is recommended that dogs are treated at 2.5-2.75 mg/kg, PO, every other day or every Monday, Wednesday, and Friday. Given in this manner, Palladia is well-tolerated. Kinavet (masitinib) is only conditionally approved. Thus, it can legally be used ONLY EXACTLY per the label indication. Both of these TKIs have also fairly recently been reported to cause proteinuria, with hypertension being seen with the Palladia. Monitoring for proteinuria as well as monitoring renal function is necessary in dogs on these medications.

Laura D. Garrett, DVM, Dip ACVIM
20th Int VECC Symp, 2014

Calculating RER

The first step in designing a feeding plan is to calculate the patient's daily resting energy requirement (RER) at current body weight. Equation to determine resting energy requirement: $70 \times BW_{kg}^{075}$ = kcal/d. For example: 10-kg dog: $70\ (10)^{075} = 70 \times 5.6 = 394$ kcal/d. If there is no exponent key on a handheld calculator (y^x), the squareroot key can be used. Enter BW and multiply by itself twice (BW x BW x BW), then press square root key twice. Multiply the result by 70. For example: 10-kg dog: 10 x 10 x 10 = 1000; square root, square root = 31.6, 5.6 x 70 = 394 kcal/d.

Allison Wara, DVM and Craig Datz, DVM, MS, Dip ABVP
NAVC Clin Brief, Nov 2014

Another breeding myth

"Smaller puppies within a litter of normal sized littermates are premature." They result from fertilized eggs at the last breeding, because "too many" breedings were allowed. Many breeders are convinced that if a bitch is bred over a prolonged period of time they may get puppies "from the last breeding" that are not as mature as those from "the first" breedings. Ovulation has been shown to occur over a time span of 24-48 hours occurring 2 days after the LH surge. The actual fertilization of secondary oocytes occurs over a short span of 1-4 days at most. Repeated breedings do not change these events. Age differences in the pups are insignificant. Notable size differences in puppies are probably due to factors such as genetics, uterine implantation location and nutrient supply related to placental health.

Kit Kaampschmidt, DVM
SW Vet Symp, 09:13

A behavioral device for cats

In this case study a 15-year-old, castrated domestic short-haired cat had a history of distress associated with veterinary visits; signs included urination in the carrier, vocalization in the car, tachycardia, aversion to restraint, and hiding on return home. The cat was fitted with a compression device (Thundershirt for Cats, thundershirt.com) and observed during fitting, transport, and after return home. The owner, veterinarian, and veterinary team were asked for assessments. The owner reported a 90% reduction in vocalization and no urination during transport. The cat's heart rate was normal, and the veterinary team claimed the cat was 50% easier to handle (e.g., restraint for cephalic venipuncture was unnecessary) than during previous visits. The owner reported that, once home, the cat interacted calmly within minutes of release from the carrier.

J. Velenovsky
Clin Brf, 11:11

Normal parturition

Many of us have never seen a normal, problem-free whelping or queening! If you have the opportunity to attend one, you will find it very helpful in truly understanding what takes place (and explaining it to novice breeders). Parturition occurs due to influences from both the fetuses and the dam. Fetuses increase the amount of corticosteroid release just prior to parturition-this is essential in starting the normal birthing process. The serum progesterone level decreases to <2 ng/ml. This precedes the typical decrease in body

temperature by about 12 hours. The breeder should monitor the bitch's body temperature 2-3 times daily (at rest) for the week prior to expected parturition to determine the bitch's normal daily variation. Prior to parturition, the temperature normally drops by a full degree below the low end of that daily variation. Note that the occasional bitch does not exhibit a drop in body temperature. When can we expect parturition to occur? Here are some guidelines based on various measurements: From breeding-57-72 days later; From LH surge-64-66 days later; From end of diestrus-+/- 58 days later; From drop in progesterone < 2ng/ml-12-24 hours later; From temperature drop-8-24 hours later (have seen up to 36 hours).

Joni L. Freshman, DVM, MS, Dip ACVIM CVA
SW Vet Symp, Sep 2014

Tranexamic acid as an emetic

Apomorphine and oral administration of 3% hydrogen peroxide, have been widely used to induce vomiting in dogs and have yielded high success rates. However, the interval from IV or ocular conjunctival administration of apomorphine and oral administration of 3% hydrogen peroxide to onset of vomiting can be lengthy (14.5 and 18.6 minutes, respectively). Tranexamic acid is an antifibrinolytic drug that is widely used to control bleeding in trauma patients. In addition to its hematologic effects, ***tranexamic acid may induce emesis*** after IV administration of a higher-than-usual dose. Findings for the single-dose experiment in this study indicated that IV administration of tranexamic acid induced emesis in a dose-dependent manner and that a 50 mg/kg dose was necessary to induce vomiting in all dogs. Lower doses of tranexamic acid (20, 30, and 40 mg/kg, IV) induced emesis, but not in all of the study dogs. Thus, a dose-escalation approach was an effective way to induce emesis when dogs did not vomit at lower doses of tranexamic acid.

Hitoshi Kakiuchi, DVM et al.
Am J Vet Res, Dec 2014

Cats and carbs

Can cats digest carbs? The Internet (and even some veterinary literature) is full of claims that cats cannot break down starch. One veterinarian who claims to be an expert in feline nutrition states that cats have a physiological decrease in the ability to utilize carbohydrates due to the lack of specific enzymatic pathways that are present in other mammals, and the lack of a salivary enzyme, amylase. This statement is only partially true. Cats have lower concentrations of amylase and glucokinase than dogs. However, they have higher activity of an enzyme called hexokinase. This is found in the liver, not the saliva, so while it is true that cats do not digest starch in their saliva, once the carbohydrates are absorbed from the intestinal tract and travel to the liver, ***they are fully metabolized***. This has been known for a long time. In a study published in 1977 cats were fed glucose, sucrose, lactose, dextrin, raw corn starch, ground wheat, ground corn, and cellulose added to a meat-based diet. For all of these carbohydrate sources except cellulose, the digestibility was >94% and all cats remained healthy.

Craig Datz, DVM, MS, Dip ABVP
SW Vet Symp, Sep 2014

Comforting video on limb amputation for owners

Colorado State U Flint Animal Cancer Center has produced a series of videos that answer questions about limb amputation. The videos aim to comfort clients worried about the surgery and their pet's quality of life. The videos illustrate expectations 2 weeks before, during, and after limb amputation. To visit the video, go to www.CSUanimalcancercenter.org/amputation.

Vet Pract News, 25:11

Mirtazapine for appetite stimulant

Mirtazapine acts as an appetite stimulant in humans, dogs, and cats and also imparts an anti-nausea effects. Mirtazapine has extensive hepatic metabolism. Among side effects reported for humans are: drowsiness, dry mouth, constipation, and weight gain, with rare hepatotoxicity. In cats, high doses may lead to hyperexcitability and muscle tremors. Recommended dosing of mirtazapine in cats with hepatic lipidosis is no greater than 1 mg/kg body weight, q24hrs, or 1.88 total dose per cat. How many doses may be safely given is undetermined; in one study a 1.88 total dose/cat was given to healthy young cats for 6 consecutive days with no adverse side effects. It has been suggested to reduce customary doses of mirtazapine by 30% in cats with liver disease, but there are no studies regarding this recommendation in veterinary patients.

Sharon Center, DVM, Dip ACVIM
2014 Am Ass'n Fel Pract Conf

Viral rhiniti, using interferon

Administration of human alpha 2b interferon at 50 U, PO, daily may help some cats with suspected chronic calicivirus or FHV-1 infection. This can now be formulated for practitioners by prescription at some pharmacies (www.roadrunnerpharmacv.com) in the USA. Topical administration of alpha interferon in saline to the eyes of cats with conjunctivitis or the nose may aid in the management of some cats. Lysine and alpha interferon are unlikely to lead to a cure, but hopefully will lessen clinical signs of disease. Intranasal administration of modified live, intranasal FHV-1 and FCV vaccines may lessen disease in some chronically infected cats. If there is a positive response to intranasal vaccination in a cat with chronic disease, the author will use this form of immunotherapy up to 3 times per year. The intranasal vaccine has been shown to potentiate cell-mediated immunity to FHV-1 better than parenteral vaccination.

Michael Lappin, DVM, PhD, Dip ACVIM
2014 AAFP Conf, Sep 2014