

*“Pearls”
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AT A GLANCE

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Levetiracetam as a first-line anticonvulsant

A secondary anticonvulsant—that is actually becoming a trusted first-line drug—is levetiracetam. The amazing thing about levetiracetam, as opposed to phenobarbital and bromide, which are pro-inhibitory, is that it is anti-excitatory. It affects the glutamate cells' ability to release their neurotransmitters. That's why it is less sedating and has an awesome therapeutic range. You can give the drug at well over 10 times the normal dose, and the only side effect you're likely to see is sedation. It's a very safe drug. Levetiracetam is available in injectable, liquid and tablet formulations, and now it's available in an extended-release formulation. Aside from sedation, there are no commonly reported side effects. Also, it's relatively affordable, doesn't require monitoring, and decreases kindling (the phenomenon in which a seizure increases the likelihood that more seizures will occur). It has minimal hepatic metabolism as well. It's **pretty much unnecessary to check blood levels** because you just keep increasing the dose until it stops working or it gets too expensive. It's great for animals that have suffered liver toxicosis but still require an anticonvulsant and can't be on phenobarbital. And, it's great for portosystemic shunt cases that develop status epilepticus.

*Fred Winger, VMD, MS, DACVIM
Vetted, Jun 2018*

Eating behavior of cats

In a study of cats on a weight-loss program, there was a consistent underestimation of BCS by owners of cats that did not lose weight. Cats are often fed in ways inconsistent with their natural patterns, and owners often choose the convenience of commercial dry cat foods, but the natural diet of wild cats is high in protein and low in carbohydrates. Cats are unable to store excess starch as glycogen, and glucose exceeding energy requirements is instead stored as fat. Studies have shown that cats fed a high-protein, low-carbohydrate diet maintained lean body mass while losing weight as compared with those fed a high-carbohydrate, low-fat diet. Canned foods provided optimal amounts of protein and carbohydrates; **canned kitten food** may provide the closest approximation to the **natural feline diet**. Cat owners must be educated that cats do not eat the same way as humans. Owners also often misinterpret a cat's vocalizations and attention-seeking behaviors as a request for fresh food.

*E.J. Collieran
WSAVMA Clin Brf, Jun 2018*

Benefits of cannabidiol oil

New pharmacokinetic and clinical study recently completed at Cornell suggests that 2 mg/kg of cannabidiol (CBD) oil twice daily can help increase comfort and activity in dogs with osteoarthritis. Investigators tested CBD oil's pain management properties using a randomized, placebo-controlled, double-blind crossover study. Dogs received either CBD oil at 2 mg/kg every 12 hours or they received placebo oil. Dogs were treated for 4 weeks with a two-week washout period. The Canine Brief Pain Inventory score and Hudson activity score determined response to treatment. The results seem to support anecdotal reports of CBD oil's benefits. Veterinary assessment showed that CBD oil reduced pain ($p < 0.03$), and the Canine Brief Pain Inventory and Hudson activity scores showed clinically significant reduction in pain and an increase in activity with CBD treatment ($p < 0.001$). According to the author's attorney, everything he found supported the premise that CBD oil being manufactured and distributed for veterinary use is **not considered illegal** either federally or on the state level. Just remember, each state has its own rules, you are responsible for maintaining your license in good standing, and this memo is not a substitute for you doing your own research.

*Sarah Wooten, DVM
DVM News Mag, Jun 2018*

The Capsule Report.®

Certifying emotional service animals

Passengers with an emotional service animal (ESA) condition are required to submit paperwork 48 hours prior to their airline company. Typical animal health documentation will include certifi-

cation of the animal's health with documentation of rabies and DPT vaccinations. Ask the client to provide you with the airline's veterinary health form to complete since it may vary from airline to airline. Typically, if the animal has not been seen for over one year you may suggest that the animal be examined prior to departure since airlines such as Delta require that the examination and shots be current. It is recommended that veterinarians read the travel forms thoroughly and base your statements regarding behavior **only on your seeing the animal in your office** versus a crowded and noisy airport or confined airplane space. You are not required to make statements or sign documentation about a patient's behavior outside the scope of your treatment of that animal. Also, do not go down the path of making any statements regarding the pet owner's medical or psychological condition since this is for the medical doctors to provide.

MN VMA News, Jul/Aug 2018

Standard Heartworm protocol vs. "slow kill"

The American Heartworm society protocol for treatment of heart worm can be expensive for clients. "Aren't there alternative protocols that don't include adulticide administration?" Treatment regimens that utilize heartworm preventives with or without doxycycline instead of an adulticide are called "slow kill" protocols. Here is why they are not recommended by the AHS. Slow kill requires up to a year—and sometimes much longer—to achieve results, during which time there is progression of pathology and resultant damage. Slow kill is less effective in eliminating adult worms than melarsomine, and the timing of worm death is unpredictable. Slow kill requires strict compliance and exercise restriction throughout the many months—or years—of treatment. "Could a protocol like this be an alternative for my patients?" This author stresses that any "slow kill" protocol is a salvage procedure, not a treatment of choice. The longer adult worms take to die, the more damage caused to the dog's pulmonary vasculature—and that damage can be permanent.

*Andrew Moorhead, DVM, MS, PhD
WSAVMA Clin Brf, Jun 2018*

Canine flu facts

Unlike human flu, canine flu is not seasonal. It's a year-round problem, and the most commonly affected dogs are middle-aged, not puppies or seniors. Dogs infected with canine influenza are potentially infectious for up to three weeks after onset. The author recommends advising clients with confirmed dog flu to keep their dogs home and isolated from other dogs for 4 weeks. The H3N2 strain produces only mild disease, but it's extremely infectious and easily vectored on human hands and clothing. Once

flu has been introduced into a veterinary hospital or other group setting, **it spreads like wildfire**. There is no evidence that canine flu infects humans. Even though the bivalent canine influenza vaccine reduces the risk of a dog contracting canine influenza, it doesn't provide sterile immunity. Much like the human influenza vaccine, it reduces the clinical signs if a dog is infected and consequently reduces the number of cases and helps control spread of the disease. According to the AVMA, canine influenza virus may persist in the environment for approximately two days and be viable on hands for 12 hours and on clothing for up to 24 hours. It appears to be easily killed by disinfectants. Patients suspected of having the flu should *not be allowed to enter or exit through the main entrance or permitted in the waiting room*. This author advises keeping these patients in the car, and, if possible, conducting the exam in the vehicle.

*Jason W. Stull, VMD, MPVM, PhD, DACVPM
DVM News Mag, Jun 2018*

Antibiotic-responsive enteropathy and cobalamin

Antibiotic-responsive enteropathy (ARE) is hard to definitively diagnose with laboratory tests. Histopathology and cytology of the intestinal mucosa are extremely insensitive at detecting ARE. Serum cobalamin and folate concentrations have been used for diagnosis and finding both a low serum cobalamin and an increased serum folate concentration has been considered relatively specific for ARE. In fact, measuring serum cobalamin and folate concentrations is relatively insensitive and non-specific for detecting ARE. There are many dogs with chronic GI disease that respond to antibiotic administration but which have normal cobalamin and/or normal folate concentrations. It would seem that treatment for ARE is justified regardless of whether the serum cobalamin and folate concentrations are normal or abnormal, leading one to ask whether there is any benefit to measuring them to diagnose this disorder. Finding hypocobalaminemia or low serum folate levels is beneficial when looking for otherwise occult gastrointestinal disease. Supplementing cobalamin can clearly make cats feel better and diarrhea diminish. In fact, it is almost getting to the point where it is never wrong to give any sick cat cobalamin injections, regardless of blood values of the vitamin. Severe hypocobalaminemia has been suggested to be a poor prognostic sign. While the value of supplementing cobalamin to cats is clear (in fact, **it is almost never wrong to give any sick cat supplemental cobalamin**), the clinical value of administering cobalamin to dogs with low serum cobalamin concentrations is very uncertain.

*Michael D. Willard, DVM, MS, DACVIM
23rd Int VECCS Symp, 09:17*

Tell clients not to brush pet's teeth

Say no to telling your clients to brush their pet's teeth every day. (Really!) Wait. Did you read that right? No to the gold standard of tooth brushing? What's wrong with tooth brushing? Simple: Virtually no one does it twice a day, or once a day, or even every other day, and anything less is worthless. So instead of continuing to push

brushing, recommend twice-daily wipes, cotton-tipped applicators (in cats) rubbed along the gingival margin, and accepted Veterinary Oral Health Council products to help decrease the formation of plaque and tartar.

*Jan Bellows, DVM, DACVD, DABVP, FAVD
DVM News Mag, May 2018*

Treating seizures with bromide

Bromide has been used from the mid 1800's; 40 mg/kg/day for KBr, KBr = 67% bromide and NaBr = 78% bromide. Eliminated through the kidneys Bromide has no effect on the liver. The half-life of bromide in the canine is 21 days so steady state will be achieved in 3 1/2 months. Bromides' half- life in cats is 12 days so steady state is achieved in 2 months. You may use analytical grade KBr mixed with distilled water to give 250 mg/ml (60 grams KBr in 8 oz. of H₂O). If you compound this yourself there may be liability issues. When using bromide you want to obtain blood levels of at least 1 mg/ml. Bromide is a salt so side effects are a salty taste, possible pancreatitis, megaesophagus and skin eruptions. In the cat the most troublesome side effect is an asthmatic like condition presenting as a cough; this necessitates discontinuation of the Bromide. In the diagnostic lab Bromide may falsely elevate Chloride determination since many analytical machines see the Br as Cl. Loading with Sodium Bromide IV may be done, however the author finds it easier to do either oral loading via stomach tube or rectally at 400-600 mg/Kg, BID, for 2 days. For Feline Anticonvulsants the author uses phenobarbital at 3-5 mg/kg/day with monitoring levels the same as for dogs. This author no longer uses bromide in cats because of the side effect of pneumonitis.

*Thomas Schubert, DVM, DACVIM, DABVP
Gulf-Atl Vet Conf, 10:17*

Dental disease causing myxomatous mitral valve disease

This common misconception arises from the association between dental disease and heart disease in people. For example, one of the most serious and common complications of patent ductus arteriosus (PDA) in people is infective endocarditis, not congestive heart failure as it is in dogs. Antibiotic prophylaxis for years has been advocated for people undergoing dental work who have a heart murmur. Therefore, the public and our clients know this and extrapolate this concern to their dogs. However, this extrapolation has never been shown to be accurate in dogs; on the contrary, dogs with bacterial endocarditis tend to be large-breed, young adult dogs with signs of systemic illness, whereas dogs with myxomatous mitral valve disease tend to be older, medium- to smaller-breed dogs with long periods (months to years) of absence of clinical signs while their heart murmurs are present. Worse yet, this association between dental disease and heart disease in humans has been refined in human medicine, and antibiotic prophylaxis has been reduced drastically. As a result, the misconception that dental disease can lead to cardiac infections, which in turn can transform into myxomatous mitral valve disease,

is **wholly unfounded**. It is perpetuated by misuse of antibiotics, which are consistently seen as effective ("The dog didn't develop a serious infection") but the same result would have occurred without antibiotic treatment.

Etienne Côté, DVM, DACVIM

Principles for FeLV testing

* Any new cats or kittens should be screened for FeLV infection before being introduced into a household. * Household cats that go outdoors or share a house with cats that go outdoors should be FeLV-tested at least yearly. Also, any cat that becomes clinically ill should be tested for FeLV immediately if it shares a household with an FeLV-infected cat. * Household cats that may have been exposed to other cats with unknown FeLV infection status should be immediately tested for FeLV and retested six weeks after exposure. In some cats, it can take up to 4 months to figure out the stage of FeLV infection. In a multicat household, it can be difficult for the owner to confine FeLV-exposed cats, assess risk to other cats and decide how to manage the situation. * FeLV tests detect infection, not clinical disease. A decision for euthanasia should **never be based solely on whether a cat is "confirmed" FeLV-infected**. While FeLV infection can be life-threatening, proper management and veterinary care can help regressively- and even progressively-infected cats have long and healthy lives.

*Glenn Olah, DVM, PhD, DABVP
DVM News Mag, Jun 2018*

Treating superficial pyoderma

As a general rule, superficial pyoderma should be treated for a minimum of 3 weeks or at least 7-10 days past resolution of all clinical signs. A narrow spectrum antibiotic should be preferred over a broad spectrum whenever possible. **Fluoroquinolones should never be used as first line of defense!** They should only be used when no other options are possible and based on culture and sensitivity results. A common mistake on the use of fluoroquinolones is the use of lower doses. Since this class of antibiotics is concentration dependent and not time dependent, it is more appropriate to give a much higher dose once daily rather than to split the dose into two administrations. This is crucial to minimize the risk of antibiotic resistance since the Mutation Prevention Concentration is typically much higher than the Minimum Inhibitory Concentration (MIC).

*Rosanna Marsella, DVM, DACVD
4th Gulf Atl Vet Conf, 10:16*

Adequan for feline pain

Don't forget the role of the DMAO, PSGAGs (Adequan). This is extra-label use, since it is labeled for use in dogs, but it is a great choice for cats. Use the same dosing for cats as dogs - - 2 mg/lb twice weekly, for 4 weeks, weekly for 4 weeks, then every 10 – 15 days. Be sure to give it SQ and not IM, and simply teach clients to deliver this at home.

Long term use is fine, and in cats this is very affordable.
Robin Downing, DVM, MS, DAAPM, DACVSMR, CVPP, CCR
2017 AAEP Fall Conf, 10:17

Selecting the fluid for urethral obstruction

Fluid therapy in the form of isotonic crystalloids is the cornerstone of stabilization. Traditionally, normal saline (0.9% NaCl) was considered the fluid of choice over concerns of exacerbating hyperkalemia through the administration of potassium containing fluids. However, evidence now supports that balanced isotonic crystalloids such as Lactated Ringer's and Plasmalyte are not only safe, but probably more ideal. Two separate studies demonstrated that balanced crystalloids corrected metabolic acidosis faster in cats with UO and did not delay time to normalization of potassium as compared to normal saline. These findings make sense within the context of fluid physiology. First, the amount of potassium in these solutions (4-5 mEq/L) is proportionally negligible compared to total body potassium stores and plasma concentrations. Considering boluses in cats rarely exceed a blood volume (~250 mL), clinicians are effectively giving a cat a single mEq of potassium during stabilization. Second, balanced isotonic solutions contain a buffer that combats metabolic acidosis whereas saline is acidifying due to its lack of a buffer, low strong ion difference, and supraphysiologic chloride content. Finally, inorganic acidosis potentiates hyperkalemia so correcting it helps lower the potassium concentration. Key point: **reach for your balanced crystalloid of choice when treating blocked cats!**

Marc Seitz, DVM, DABVP
Music City Vet Conf, 02:17

CCL rupture, conservative approach

When this author first tells owners that their dog has a torn cruciate, three options are offered. Option 1 is we do nothing. By do nothing it is meant we cage confine for 6 weeks with medical management (analgesia and NSAIDs) and (hopefully) formal rehabilitation therapy. The most important aspect here is confinement. These owners have to be aware the goal of conservative management is to allow periarticular fibrosis to occur. This can't occur with the dog remaining active. To break it down to them the owners are told the dog must be kept in an area where he/she can stand up, lie down, and turn around. The dog eats, drinks, and sleeps in the crate. It only goes outside to urinate and defecate on a leash then back into the crate. The author also throws the disclaimer in that in his opinion OA is worse with a rapid progression as long as the stifle is unstable and usually if this is a larger dog they won't return to full function. Also they are told that the dog will appear to be doing "okay"; however, they have a very **high chance of developing a meniscal tear**. This author tends to tell owners it's not "if" but more of a matter of "when" they tear their meniscus.

Matt Brunke, DVM, CCRP and David Dycus, DVM, MS
Fetch, San Diego, 12:17

Managing arterial thromboembolism in the cat

A prospective, multi-center clinical trial comparing the efficacy of aspirin (81 mg, PO, q72h) and clopidogrel (18.75 mg, PO q24h) for prevention of ATE recurrence in cats with cardiac disease and prior ATE reported a significant survival benefit for clopidogrel. It is not known whether this result can be extrapolated to the prevention of thrombus formation in cats that have cardiac disease but have not experienced an ATE episode yet. Nevertheless, given the painful and catastrophic effects on quality of life of an ATE episode, the **author routinely prescribes clopidogrel** (Plavix) for cats with recognized echocardiographic indicators for increased ATE risk. These include severe left atrial dilatation, poor systolic function, spontaneous echocardiographic contrast and intracardiac thrombus. This highlights the need for echocardiography to evaluate ATE risk in any cat with suspected cardiac disease.

Simon Dennis, BVetMed, MVM, DECVIM
Atl Coast Vet Conf, 10:17

Addison's in cats, not so uncommon

This author thinks hypoadrenocorticism is underreported and underdiagnosed in cats. These disorders are so common that if you look for them, you will probably diagnose either disorder in the next month. The main reason this author thinks Addisonian cats get misdiagnosed is that a lot of them present with azotemia and are **diagnosed as having kidney disease**. If you have a feline patient that presents with azotemia that resolves after 24 hours of fluid therapy, then kidney disease was not the cause of that azotemia. In these cases, recommend adrenal testing to the owner to rule out Addison's. Adrenal stimulation is conducted with cosyntropin (Cortrosyn) at a dose of 5 µg/kg given IV. Blood samples are collected before and then 60 minutes after administration. Cats with Addison's disease will have undetectable cortisol concentrations both before and after.

David Bruyette, DVM, DACVIM
DVM News Mag, Jun 2018

Food allergy not so common

Report from the 2018 State of Pet health Report from Banning Pet Hospital (over 2.5 million dogs in study). Pet owners are increasingly aware of food sensitivities in people—and that diet plays a role in skin health. Many are led to believe their itchy pet may also be suffering from a food allergy. Banfield Pet Hospital data supports that **food allergies in our pets are uncommon**, and other causes of certain skin conditions should be investigated before pursuing a food allergy diagnosis. It was also noted that food-allergic pets are more prone to skin infections than non-food-allergic pets are. The prevalence of pyoderma in food-allergic dogs is six times the prevalence of pyoderma in non-food-allergic dogs and, similarly in cats, 15 times more prevalent in those that are food-allergic.

JAVMA, Jul 15, 2018

The dilemma of over-diagnosis

Veterinarians are often fearful of misdiagnosis; incorrectly identifying disorders in their patients or diagnosing diseases the patients do not actually have. However, few worry about the dangers of overdiagnosis; the correct diagnosis and treatment of disorders patients do have but which will never cause clinical symptoms or mortality. Overdiagnosis is driven by numerous factors. Screening tests, imaging, and other diagnostics employed without specific clinical justification frequently lead to the detection of abnormalities. Such abnormalities are far less likely to be clinically important than those which cause symptoms, and therefore they often represent overdiagnosis. However, once an abnormality is detected, some of the psychological harm to patients or caregivers has already occurred. And because of the anxiety induced by the finding and the desire of both clients and doctors to take some action, even when it is unclear this will benefit the patient (a phenomenon known as “commission bias”), further testing and even therapy often results from an initial overdiagnosis. In the meantime, in the absence of such data, the best strategy is to understand the limitations of our diagnostic tests, including important measures such as their positive and negative predictive value, which help us to appreciate the likely significance and reliability of test results in particular patient populations. We should also ensure that we have an appropriate clinical index of suspicion for any condition before we begin testing for it. “Fishing expeditions,” “shotgun diagnostics,” indiscriminate imaging, and other such irrational diagnostic practices raise the risk of overdiagnosis. We must also learn to accept the inevitable uncertainty in medicine and be honest with clients about our ability to predict and control all patient outcomes. We need to recognize and disclose that testing and treatment have costs and risks as well as benefits, especially in patients without significant clinical symptoms associated with the disorders we are trying to diagnose and treat. Though it is psychologically more difficult for us, it is often wiser to avoid action when there is not good evidence to show that our actions will truly benefit our patients. Don't just do something, stand there!

Brennen McKenzie, MA, MSc, VMD
ACVIM For, 06:17

To fast or not before anesthesia

Historically animals undergoing elective procedures have been fasted for prolonged periods of time. For example, “NPO” from midnight (“the overnight fast”) has been a common recommendation, even if that patient is not scheduled for surgery till later the following day. In veterinary medicine fasting recommendations have not, until recently been based on scientific evidence and have been empirical at best. One randomized prospective study reported on 120 healthy dogs scheduled for an elective surgery; half of the dogs were fasted for 10 hours and the other half received a meal 3 hour before anesthesia. During anesthesia an esophageal pH electrode was placed. The incidence of GER was 20% in the dogs fasted for 10 hours and 5%

for those undergoing a 3 hour fast. The same group of researchers have also shown that longer fasting times actually result in more acidic gastric contents and do not alter the volume of stomach contents compared to shorter fasting times. Low gastric pH decreases the lower esophageal sphincter pressure and permits more fluid to reflux from the stomach into the esophagus. They studied several different types of food given 3 or 10 hours before anesthesia including dried and canned foods with different fat and protein content. Based on these studies it **seems prudent to allow a small ($\leq 50\%$ of the daily ration) meal of canned food up to 3 hours before anesthesia**. Another issue to be aware of is that stress decreases gastric emptying and gastrointestinal transit times due to sympathetic stimulation. Many animals admitted to a hospital are anxious or fearful and this in itself will delay gastric emptying.

Sheilah A. Robertson, BVMS (Hons), PhD, DACVAA, DECVA
VMX 2018, Feb 2018

Chronic bronchial disease

The role of long-term antimicrobial therapy appears to be underappreciated (at least in the veterinary literature) in managing patients with chronic bronchial disease (CBD). Although bacterial infection (pneumonia) is seldom recognized as a cofactor in dogs with CBD, many pulmonologists (human medicine) consider “low-grade” bacterial colonization within the small airways to be a key factor in the pathogenesis of CBD. Although relatively uncommon, opportunistic infections (pneumonia) involving normal respiratory flora can become life-threatening in dogs with significantly compromised respiratory defense mechanisms, particularly tracheobronchial collapse and diminished mucociliary transport. The role of *B. bronchiseptica* as a complicating factor in the pathogenesis of CBD must not be underestimated. When in vitro culture and sensitivity results are not immediately available, the clinician is justified in prescribing antimicrobial. In the author's experience, **antimicrobial therapy plays a critical role in the long-term management of CBD** in dogs. The most commonly prescribed antibiotics are listed below: DOXYCYCLINE - 5 mg/kg, PO, q12h; alternatively: 10 mg/kg, PO, once daily); or AZITHROMYCIN (5 mg/kg, PO, once daily - **recommended** because of the compliance associated with once daily administration in dogs); or - ENROFLOXACIN (2.5-5.0 mg/kg, PO, once daily) *caution when using with methyxanthine (aminophylline or theophylline) bronchodilators*. Administration: For example, azithromycin would be prescribed for 14 to 21 days (5.0 mg/kg, once daily) for a patient with CBD. Following treatment, it is not uncommon for the patient's clinical signs to resolve for several weeks, or even months, followed by a gradual redevelopment of cough. In this case, the treatment regimen with azithromycin can be repeated with similar results expected. If an individual patient does become less responsive to therapy, another antimicrobial can be selected and administered in the same way.

Richard B. Ford, DVM, MS
SD VMA Conf, 08:16