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VETERINARY SURGICAL ASSOCIATES  
1410 Monument Blvd., Suite 100  
Concord, CA 94520

### New Anticonvulsants in use for Maintenance Therapy for Idiopathic Epilepsy (cont.)

but this association has not been confirmed in veterinary patients. The starting dose is 10mg/kg every 8 hours, and some dogs may require up to 20mg/kg or dosing every 6 hours. The human liquid gabapentin formulation is manufactured with xylitol at near toxic levels in the therapeutic dose range. Therefore, it is strongly recommended that all patients who require the liquid formulation have it specifically compounded without xylitol.

In general if you have a complicated case or would like to discuss using a newer anticonvulsant medication, a VSA neurologist is readily available for a phone consultation.

More information on the history, diagnosis, and treatment of both seizures and degenerative myelopathy can be found at [www.vsasurgery.com/continuinged/index.htm](http://www.vsasurgery.com/continuinged/index.htm)

*Dedicated to the art of surgery for the benefit of you, your client and your patients.*

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### SERVICES

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Spinal tumors  
Vertebral stabilization  
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### LOCATIONS

800.834.7874

*Concord*  
1410 Monument Blvd.  
Concord, CA 94520  
Tel 925.827.1777  
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*San Mateo*  
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### Expanding VSA Services for You and Your Clients

As we mark the anniversary of the economic downturn and look to the hopeful indicators of recovery, many of us are examining the lessons that this past year has brought. One trend that is likely to persist is the search for true value in the services that we choose, and that is certainly a trend recognized by the veterinary industry as a whole. Our clients have always placed a high value on the services that VSA provides, mirroring the value of the human-animal bond that they share with their pet. We consider the provision of excellent patient care and client service a fundamental element to our Mission:

*To significantly and continually improve the quality of veterinary medicine offered in the San Francisco Bay Area through the integration of Science, Compassion, and Integrity.*

With that in mind, VSA has worked to expand our service offerings this past year to you, the family veterinarian, so that you can partner with us to provide exceptional care to your clients and patients. This newsletter is dedicated to neurology and features **Drs. Carrie Journey and Christina Vitale**. These two board-certified neurologists have come together to start the neurology department within VSA and are providing neurological services from our San Mateo, Campbell, and Dublin facilities. They have expanded the neurologic services that VSA formerly provided to include surgery of the brain, as well as full diagnostics for intracranial, spinal, and peripheral neurologic conditions. They welcome phone consultations as well as direct referrals.

Another service first offered this summer was the addition of **Saturday hours** available at our **San Mateo** location. We are fully staffed for consultations and surgery, allowing for more convenient appointment times for your clients and supplementing our continued 24/7 emergency availability. For those clients not geographically close to San Mateo but needing Saturday appointments, we offer continued follow-up care through one of our other locations for the client's future convenience.

Finally, we have expanded our physical rehabilitation capabilities by the addition of **Jenny Jones, PT, MS, DPT**. Jenny comes to us with a doctorate in physical therapy and a background in pediatric neurology. Jenny has found there are numerous parallels between our animal patients and young children regarding teaching exercises and performing treatments when your patient cannot verbally express their issues to you! She will augment the current rehabilitation team of Dr. Julie Smith, boarded in surgery and certified in canine rehabilitation, and two nurses who are also

SAVE THE DATE : April 18, 2010

San Ramon Marriott  
11th Annual VSA/VMS  
Small Animal  
Veterinary Symposium





## Expanding VSA Services for You and Your Clients (cont.)

certified in canine rehabilitation. We will base our rehabilitation program in Campbell where we have the underwater treadmill, but services will also be offered in our San Mateo and Concord locations on a limited basis.

During this time of economic uncertainty, VSA remains committed to looking for ways to expand our offerings so that we can continue to provide an experience that has tremendous value to your clients and serves as an extension of the care that you provide your patients.



## Degenerative Myelopathy: New Developments in Diagnosis

Christina Vitale, DVM, ACVIM (Neurology)



Degenerative myelopathy (DM) is a progressive canine spinal cord disease characterized by axon and myelin degeneration, with the white matter tracks of the thoracolumbar spinal cord most severely affected. As the disease progresses, lesions will also appear in the lumbosacral and cervical spinal cord, and clinical signs will follow this progression. DM is purely a degenerative process; there is no inflammatory component.

The only way to obtain a definitive diagnosis of DM is with histopathologic examination of the spinal cord at postmortem. During life, however, we can achieve a presumptive diagnosis of DM by exclusion of other myelopathies. Following a complete neurologic examination and general health evaluation as indicated for each patient, advanced diagnostic including an MRI (ideal) or myelogram and cerebrospinal fluid (CSF) analysis should be performed. The advanced imaging will help to rule out other nonpainful myelopathies, including neoplasia and myelitis, as well as compressive myelopathies, such as intervertebral disc disease, extradural neoplasia, and intradural-extramedullary neoplasia. The cerebrospinal fluid analysis will help rule out inflammatory myelopathies. In dogs with DM, the results of both the advanced imaging and CSF analysis should be normal. It is not uncommon to see evidence of intervertebral disc degeneration with varying degrees of extrusion or protrusion, however the degree of epidural fat and cerebrospinal fluid attenuation can be evaluated to determine the likely clinical significance of these lesions. A lack of spinal pain will also support the fact that these lesions may be clinically insignificant. Electromyography and nerve conduction studies are also indicated to help with diagnosis in some cases.

Thanks to combined efforts by the University of Missouri and the Broad Institute of MIT/Harvard, a muta-

tion in the superoxide dismutase 1 (SOD-1) gene has been discovered in dogs affected with DM. This same gene is mutated in human patients with familial amyotrophic lateral sclerosis (ALS), or Lou Gehrig's disease. A test for the presence of this mutated gene is now available and being offered through the OFA. The test can be done either on an EDTA blood sample or a cheek swab, and it will reveal if the patient is homozygous for the normal SOD-1 gene, homozygous for the mutated SOD-1 gene, or heterozygous.

**Homozygous normal gene (clear)** - It is highly unlikely that a patient's signs are due to DM if this is the test result. It is also unlikely that this dog will develop DM in the future.

**Heterozygous (carrier)** - It is still unlikely that this patient's signs are due to DM and unlikely that they will develop DM in the future.

**Homozygous affected/mutated gene (affected)** - If the clinical signs are consistent with those of DM, and if the advanced imaging and CSF analysis are normal, it is likely (but not definitive) that this dog has DM. It is also possible that a dog with this test result could develop DM in the future. At this point, all dogs that have been studied with a confirmed diagnosis of DM have had this test result. However, numerous dogs with this test result have not had, nor have they developed DM. Therefore, the terminology of "affected" that is used for this category can be misleading.

Though familiarity with the test is imperative in order to reach meaningful conclusions, care must be taken to ensure that the owners are counseled by a veterinarian not only familiar with the test itself, but also familiar with the patient being tested and that particular patient's clinical signs.

In addition to the DNA test being used to aid in presumptive diagnoses in dogs exhibiting clinical signs, it is also being used for screening by many breeders. At this time, researchers are not recommending removal of dogs with carrier or affected test results from the breeding population, but they are encouraging breeders to consider a test result as one factor when planning an optimally balanced breeding. Since this test is still relatively new, the total number of dogs with a DNA test and postmortem spinal cord examination is not high, and this should be considered when interpreting results. While presence of the mutation is clearly a risk factor in development of the disease, there are certainly other, currently undefined risk factors involved. This test provides a helpful piece of information, but histopathologic evaluation of the spinal cord is still the only way to reach a definitive diagnosis of DM.

Researchers are aggressively pursuing this disease in many breeds to rapidly increase this pool of data, and consequently, some dogs may be eligible for free DNA testing. The Canine Genetic Disease Network is an excellent resource for both veterinarians and clients: it provides a summary of the disease, a link to the OFA website for sample submission, guidelines on which dogs are eligible for free testing, and information for breeders. The website is <http://www.caninegenetic-diseases.net/DM/mainDM.htm>.

If you have any questions about DNA test results in your patients, please contact a VSA neurologist to discuss the case with you and/or your client.

## New Anticonvulsants in use for Maintenance Therapy for Idiopathic Epilepsy

Carrie Journey, DVM, ACVIM (Neurology)



Somewhere around 5% of all dogs and 1% of all cats will have a seizure at some point in their life, making this a fairly common presentation in emergency and general practice. Technically speaking, a seizure is a group of neurons that are abnormally excited and are therefore firing in an uncontrolled and synchronous manner. While this pathophysiology is interesting, it does little to help the patients, clients, and veterinarians that are dealing with seizures. The full differential list for seizures is long, but can be generally grouped in to three categories: metabolic disease, structural disease of the brain, and idiopathic epilepsy. This categorization is especially useful in conversations with clients as it also provides a framework to discuss diagnostics: blood work investigates metabolic causes, MRI and spinal tap investigate structural disease, while all tests will indicate normal for idiopathic epileptics.

Most veterinarians have seen a good number of seizure patients and therefore have some familiarity with phenobarbital and potassium bromide in the treatment of idiopathic epilepsy. The appropriate use of these two anticonvulsants is reported to control 75% of idiopathic epileptics. The other 25% of patients are much more challenging, and will often require the use of so-called "second-line" or "add-on" anticonvulsants.

The three newer drugs that are used most frequently are **gabapentin (Neurontin)**, **zonisamide (Zonegran)** and **levetiracetam (Keppra)**. As these drugs are relatively new, we are still learning about them and the information can seem to change on a month-to-month basis. They have been evaluated for safety in dogs, and in general have fewer side effects than either of the standard anticonvulsants. Literature regarding use in cats is sparse, but some new trials are underway. Multiple drug mechanisms have been suggested for each of

these medications, but the true mechanism of action is unknown. Blood levels are available for all of these medications through Auburn University. As therapeutic ranges have yet to be firmly established, results should be interpreted with caution. Levels can be somewhat helpful in a comparative context (i.e. the medication was effective at level X and now is not effective at level Y), but otherwise they are mainly of academic interest. Previously, many of these drugs were cost prohibitive and, due to this and unfamiliarity, they had been primarily used as add-on or rescue therapy in patients unresponsive to bromide and phenobarbital. With the arrival of cheaper generics and increasing knowledge, however, they are being considered more frequently as first line drugs in a variety of patients.

Gabapentin and zonisamide have anecdotally been used in cats with some success and minimal side effects. However, there is a published favorable clinical trial of the use of levetiracetam in cats, making this the current add-on drug of choice in this species.

Levetiracetam is the second-line drug of choice in patients with liver disease. It is also, as mentioned, helpful as an IV bolus in patients in status epilepticus. The majority of the drug is excreted unchanged in the urine and, in general, it is extremely well tolerated. The drug is dosed starting between 20-40mg/kg every 8 hours and is increased by 20mg/kg increments until it becomes cost prohibitive. It has been reported that some patients will return to their original seizure frequency within 8 months of starting levetiracetam, which has been termed "the honeymoon effect". The honeymoon effect has been anecdotally reported with other add-on anticonvulsants, but this has not been confirmed in the literature.

Zonisamide has many attractive qualities over levetiracetam and gabapentin, particularly since it is dosed twice a day rather than the three to four times. It is partially metabolized by the liver, so must be used with caution in patients with liver disease, though it has not been reported to cause toxicity, so it can still be considered in these patients. The starting dose is 5mg/kg every 12 hours. Due to hepatic microsomal enzyme induction, patients that are currently on phenobarbital should be started at 10mg/kg every 12 hours. Side effects are minimal, and are usually restricted to mild GI upset. The lack of significant sedation or ataxia caused by this medication is particularly helpful in patients with pre-existing deficits that we do not wish to make more sedate or ataxic, even temporarily.

Gabapentin is only moderately effective as an anticonvulsant. It is more useful in the treatment of neuropathic pain, such as that which exists in caudal occipital malformation syndrome. In human beings, it is more effective in treatment of partial seizures,