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Canine Idiopathic Epilepsy

Epileptic seizures are defined as transient signs due abnormal excessive or synchronous neuronal activity in the brain, and epilepsy refers to at least two unprovoked seizures more than 24 hours apart. The term idiopathic means a disease of unknown cause. We now better understand that idiopathic epilepsy (IE) in dogs most likely has an underlying genetic cause. In spite of this strong evidence for a genetic cause, the association of specific genetic variants with epilepsy in most breeds has remained elusive. The prevalence of epilepsy is significantly greater in purebred dogs versus mixed breed dogs. Male dogs are more commonly affected than females. The majority of epileptic dogs have their first seizure between 1 and 5 years of age, and dogs in that age range are more likely to be diagnosed as idiopathic epileptics, although about one-third of dogs 1-5 years old will be diagnosed with a structural or metabolic cause.

Clinical Signs

Seizures in dogs with IE can be either generalized or focal in onset. A generalized seizure consists of tonic (stiffening) and clonic (paddling) types of movement and the animal loses consciousness. A focal seizure may consist of abnormal movements in one part of the body with or without a change in mentation. The severity of seizures may worsen with subsequent seizures or over time. Sometimes the seizures may last for more than five minutes (status) or occur one after another within a short time period (cluster). Both situations require management by a primary care veterinarian.

Importantly, a dog with IE is neurologically normal in between the seizure episodes.

Diagnosis

University of Missouri Veterinary Health Center
900 E. Campus Drive Columbia, MO 65211
573-882-7821
vhc.missouri.edu



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Idiopathic epilepsy is diagnosed by ruling out other acquired diseases that also can manifest seizures.

A minimum database that includes a complete blood count, biochemical analysis and urinalysis is useful to exclude other underlying systemic diseases outside of the brain. These diagnostic testing procedures also assist in ensuring the animal is healthy for anesthesia. Magnetic resonance imaging is the preferred imaging technique for presumptive diagnosis of epilepsy by ruling out other diseases that are identified by structural lesions such as inflammation or a brain tumor. Analysis of cerebrospinal fluid (CSF) can aid in diagnosis and ruling out overt inflammatory disease.

Treatment

The decision to start antiepileptic drug (AED) treatment is based on a number of factors, including etiology, risk of recurrence, seizure type and tolerability. A clinician's decision to start AED therapy relies on the risk versus benefit and the individualized patient assessment while considering the owner's financial and emotional commitments. In dogs, long-term seizure management is thought to be most successful if AED therapy is initiated early after onset of seizures, especially in dogs with frequent seizures and in dog breeds known to have severe epilepsy.

Although a variety of AEDs are used for management of epileptic dogs, there are no evidence-based guidelines regarding the choice of a first-line AED for long-term management of seizure control in dogs. In principle, administration of a single AED is preferred because it avoids drug-to-drug interactions and improves owner compliance. Phenobarbital and potassium bromide have been used as first-choice sole AEDs for long-term treatment of IE in dogs based on their long-standing history, widespread availability and low cost. During the past 20 years, many newer AEDs with



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improved tolerability, and fewer side effects and drug interactions have been developed for treatment of human epilepsy. Many of these same drugs have been determined to be safe also in our veterinary patients, such as levetiracetam, zonisamide, gabapentin and pregabalin.

After initiation of an AED, it is important to systematically monitor the seizure control, systemic effects of the drug, and serum drug concentrations. The focus of monitoring AED treatment is to optimize seizure control while minimizing adverse effects. Epilepsy management depends on accurate owner observation when assessing the efficacy of therapy. Owners often are instructed to maintain a logbook to document seizure occurrences and changes in medication administration. Adjustments in dosage often are based on the assessment of the seizure control in addition to serum drug concentration and drug side effects. It is important to have regular assessment of serum concentrations even at times when seizures are well controlled in order to monitor for toxic levels, especially for drugs with a narrow therapeutic window (i.e. phenobarbital and potassium bromide), to monitor for serum concentration fluctuations and to have awareness when there is a need to make changes in therapy.

Prognosis

Specifically, risk factors in IE dogs for premature death by euthanasia include younger age of onset, high initial seizure frequency, poor seizure control, and episodes of status epilepticus, or seizures that last longer than five minutes. Approximately 40-60 percent of dogs with IE have one or more episodes of cluster seizures or status epilepsy, and a mean lifespan of only 8 years compared to 11 years for those with epilepsy without episodes status epilepsy. Epileptic dogs that have had cluster

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seizures are known to be significantly less likely to achieve remission with any AED treatment.

Though life expectancy of the pet may not be affected, the odds of an epileptic going into complete remission and not requiring ongoing therapy are low: 6-8 percent in dogs. Thus dogs with IE usually require lifelong therapy and commitment from the pet owner. A balance between quality of life and therapeutic success is often key for an owner's commitment to their pet's therapy.