



Seizures

What are Seizures?

Seizures are the most common presenting neurologic complaint in veterinary medicine. A seizure is the clinical manifestation of excessive electrical activity in the cerebral cortex. Generalized tonic-clonic seizures ('grand mal') are the most common type of seizures in dogs and cats. These are often characterized by a stiffening of the neck and legs, stumbling and falling over, uncontrollable chewing, drooling, paddling of the limbs, loss of bladder control, defecating, vocalizing, and violent shaking and trembling.

Seizures can last a few seconds to a few minutes (average of 1 minute) and the patient is typically unaware of the surroundings during this period. In some rare cases, the seizures will not stop or be prolonged and this is referred to as status epilepticus.

After a seizure, your pet may appear confused, disoriented, dazed, or sleepy; this is called the **post-ictal period**.

Prior to the seizure, many pets will also experience an **aura** stage. This stage may or may not be recognized and can last anywhere from just a few seconds to a few minutes. It is characterized by your pet appearing anxious, frightened, or dazed, as if they can sense an upcoming seizure.

Many other medical conditions or episodes may appear like seizures. These include vestibular episodes (vertigo), neck pain, syncope (fainting), narcolepsy/cataplexy, REM sleep movements and other movement disorders (dyskinesias, myoclonus, myotonia, etc.).

As such, the most important initial step for the neurologist is to determine if the patient is truly having seizures.

What are Causes of Seizures?

Broadly, seizures can be caused by problems outside of the brain or by problems within the brain itself. These include metabolic derangements, toxins, head trauma, infectious diseases, inflammatory brain diseases, birth defects and primary or metastatic neoplasia (brain tumors).

The most common cause for seizures in young (1–5-year-old) dogs is idiopathic or genetic epilepsy with an incidence between 0.5-5% of the pet dog population.

Cats with seizures are more likely to have an underlying identifiable cause, although idiopathic epilepsy does occur in cats.

What is Epilepsy?

Epilepsy is a condition characterized by recurrent seizures over a long period of time. More practically, epilepsy can be defined as two or more seizures that occur over a period of at least 1 month. Epilepsy itself is not a specific disease; it is a clinical sign.

Some dog breeds have a much higher incidence of epilepsy and therefore a heritable (genetic) cause is suspected. While the exact reason remains unknown, seizures in these breeds are theorized to be due to abnormal ion channels in the brain or abnormal organization of nerve fibers in the brain. Male dogs may also be more predisposed.

Dog Breeds Predisposed to Epilepsy

Beagle	Belgian Shepherd (Tervuren)	Bernese Mountain Dog
Border Collie	Boxer	Cocker Spaniel
Collie	Dachshund	Dalmatian
English Springer Spaniel	Finnish Spitz	German Shepherd
Golden Retriever	Irish Wolfhound	Keeshond
Labrador Retriever	Miniature Schnauzer	Nova Scotia DTR
Saint Bernard	Siberian Husky	Standard Poodle
Vizsla		

What is Idiopathic Epilepsy?

Idiopathic epilepsy is a diagnosis of exclusion. By definition, an 'idiopathic' epileptic should be between the ages of 1 and 5 years of age for dogs (keeping in mind that there are always outliers). These patients are neurologically normal between seizures and will have a normal metabolic workup, a structurally normal brain on MRI, and normal CSF analysis results.

Diagnostic Tests

Possible tests recommended for your pet may include:

- Bloodwork (Chemistry profile, pre and post-prandial bile acids, CBC and urinalysis)
- Blood pressure
- Infectious disease testing
- MRI of Brain +/- spinal tap

When to Start AED (Anti-epileptic Drug) Treatment?

General guidelines on when to start an anticonvulsant include:

- More than 1 seizure a month
- More than 1 seizure in a 24-hour period (cluster seizures)
- Status epilepticus (seizure activity lasting longer than 5 minutes, or seizures that occur close together with incomplete neurologic recovery between seizures)

Epileptic patients treated early may have better long-term control of their seizures compared to those that have multiple seizures before treatment is started. As such, early intervention/treatment with AED therapy is recommended.

What Drugs May be Recommended?

Phenobarbital (PB) and potassium bromide (KBr-dogs only) are both very adequate first-line antiepileptic medications for dogs in spite of the addition of newer anticonvulsants to veterinary medicine. Other antiepileptic medications commonly used in veterinary medicine are zonisamide and levetiracetam (Keppra).

Imepitoin (Pexion) is a newer medication licensed in the EU for treatment of seizures in both dogs and cats. It is not yet widely available in the United States, however, and is currently only FDA approved for treatment of fear/anxiety disorders in dogs.

Any of the above drugs may be used alone or in combination.

Prognosis

Fortunately, good management of canine idiopathic epilepsy is possible in about 70-80% of cases treated with either Phenobarbital (PB) or potassium bromide (KBr) monotherapy. There are very few “hard and fast” rules when it comes to managing seizures in dogs (and cats). Every case is unique and the decision on which anticonvulsant(s) to use is based on:

- Age of the animal
- Seizure frequency
- Owner compliance/ease and frequency of administration
- Side effects
- Cost of medication and therapeutic monitoring (i.e. serum phenobarbital levels, chemistry, CBC etc.)

Ultimately, the goal of seizure management is ‘control’ of seizures. Generally speaking this means reducing the seizure frequency and severity to a point that is deemed “acceptable” (or by 50%, with minimal drug side effects).

Rarely are we successful enough to completely rid a patient of seizures. AED therapy is typically life-long with rare exceptions.

References

1. Dewey CW. Seizures and Narcolepsy. A practical Guide to Canine and Feline Neurology, 2016: 249-263.
2. Platt, Simon R., Olby, Natasha J., BSAVA Manual of Canine and Feline Neurology Fourth Edition, 2020: 117-135.