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SEIZURES AND EPILEPSY

Like your own brain, your pet's brain functions by transmission of electrical impulses amongst its cells. These impulses are under precise control to allow smooth movement and normal function. A ***seizure*** is a sudden, excessive discharge of electrical energy in groups of brain cells. Recurring seizures are referred to as ***epilepsy***, which may be subdivided as either Idiopathic (primary) epilepsy, where an underlying cause is not evident, or Symptomatic (secondary) epilepsy, where a known underlying cause can be identified (or is suspected).

While defining the word seizure may be straightforward, recognizing a seizure in your pet, distinguishing primary from secondary epilepsy and treating the disease may not be. Additionally, it is often very frightening seeing your pet have a seizure. The purpose of this handout is to provide you with some information regarding the causes of and treatment for seizures in pets, because better understanding of the nature of the problem will often lead to more successful management of its signs.

What happens during a seizure? Seizures are composed of three stages. The first, called the ***aura***, usually occurs minutes prior to the onset of the actual seizure. While in most cases it is not recognized, some owners do notice that their pets may hide, appear more nervous, or be more "clingy" right before the onset of a seizure. The second stage, called ***ictus***, is the actual seizure, usually lasting just a few minutes. Signs seen during this stage are variable, from *focal seizures*, which in which only one part of the body is affected (e.g., jaw chattering, limb twitching, fly-biting behavior) to *tonic-clonic seizures*, characterized by an initial muscle rigidity followed by paddling, jerking and chewing movements. The final stage, called the ***postictal*** period, lasting from a few minutes to a few days, occurs after the seizure itself. Pets may be disoriented, confused or restless and sometimes may have balance problems and/or other nervous system signs. ***Cluster seizures*** are defined as 3 or more seizures occurring over minutes to hours, with normal consciousness between seizures. Seizures where ictus lasts for more than a few minutes are referred to as ***Status epilepticus***.

While the underlying causes of seizures and epilepsy may differ, a few generalities are often present:

- Pets usually appear completely normal between seizure episodes.
- There is usually NO set pattern of frequency or severity of seizure occurrence. Without a reliably recognized aura or a known inciting cause (e.g., ingestion of a poison known to cause seizures), the onset of a seizure usually cannot be predicted.
- Status epilepticus and cluster seizures should be considered emergencies. **Seek *immediate* treatment either here at the clinic or at an emergency center.**
- Pets may not be aware of what they are doing and do not have control during a seizure, so it is important to avoid injury to yourself in trying to handle a seizuring pet. Be especially careful around your pet's mouth so you do not get bitten.
- While some dogs have a genetic predisposition to developing epilepsy (e.g., Beagle, German Shepherd, Golden Retriever, Labrador Retriever, Keeshond and Dachshund to name a few), any breed of dog can develop either primary or secondary epilepsy.

What are the underlying causes of seizures? Distinguishing primary from secondary epilepsy is often difficult for several reasons. First and foremost, there is no definitive test for primary epilepsy; it is a diagnosis of exclusion made by ruling out all other causes of seizures. Second, dogs with epilepsy are typically normal between seizures, further complicating our ability to diagnose underlying causes. Third, some toxic exposures may cause seizures that are not epilepsy. Multiple exposures to a toxin (e.g., certain mushrooms, other chemicals) unbeknownst to the owner may be mistaken for epilepsy.

It is still, however, very important to try to distinguish primary from secondary epilepsy. If there is an underlying cause to the seizures, identifying and treating that underlying cause may resolve the problem. For those identified problems that cannot be cured, knowing the underlying cause may help us establish a prognosis and/or choose treatments that are best suited to that problem. Despite the difficulty in trying to determine an underlying cause, several factors may help us:

- **Age of the pet at the first onset of signs:** Pets under one year of age are more likely to have seizures secondary to infections, congenital or metabolic diseases rather than Primary epilepsy. Pets over five years of age are more likely to have seizures secondary to cancerous conditions, metabolic diseases and/or organ failure. Primary epilepsy most often first presents in dogs between one and five years of age, and is uncommon in cats in the USA. Pets of *any* age may experience seizures resulting from traumatic injury or exposure to a toxic substance. Note that age guidelines are not rigid; for example, dogs younger or older than the usual age range for primary epilepsy may still have it.
- **History and observations by the owner:** Your observations of your pet's behavior before, during and after a potential seizure can be extremely helpful in determining whether the event was an actual seizure as well as identifying other factors that may influence seizure occurrence. It is often helpful to keep a log of exactly when your pet has a seizure.
- **Physical exam findings:** While physical exam findings of most seizuring pets are within normal limits between seizures, the presence of abnormalities often aids us in identifying an underlying cause to the seizures.
- **Laboratory findings:** Laboratory testing in **all** seizuring pets is vital, as seizures *always* indicate dysfunction within the brain. Even in pets where primary epilepsy is considered the most likely diagnosis, the presence of other underlying seizure causes must be ruled out. Specific testing will be discussed by the Dr., but often includes a blood count, profile and liver function tests.

How are seizures treated? Treatment of seizures varies according to the underlying cause, age of the pet, and the status of the pet's other systems (e.g., liver, kidneys), as well as how often the seizures occur and how severe they are. While treatment plans are individualized for each pet, some general principles apply. First, if possible, the underlying cause to the seizure is treated (if one can be found). Second, once a pet is started on anti-seizure medication it usually must be given for the remainder of the pet's lifetime. The two most common medications used are ***Phenobarbital*** and ***Potassium Bromide***. It is vital to give ALL medications prescribed at the correct dosage and time as directed by your veterinarian. Failure to do so may result in a seizure. Periodic testing is needed to monitor drug levels in the body as well as the effects of anti seizure medications on other organ systems. Dosage adjustments are often needed based on blood tests and seizure frequency. Note that while our goal is to eliminate seizures as much as possible, many pets will experience an occasional seizure even while on anti seizure medications.

In summary, epilepsy is the ongoing occurrence of seizures, which result from abnormal electrical activity in the brain. In trying to manage seizures we try to distinguish between Primary epilepsy, for which an underlying cause is not evident, and Secondary epilepsy for which there is an underlying cause that may be triggering the seizures. The goal of treatment is to reduce or eliminate the frequency and severity of the seizures themselves by treating the underlying condition and/or administering anti seizure medications on an ongoing basis.

Pets who have seizures where the active (ictal) phase is lasting more than 5-10 minutes, or who are experiencing cluster seizures, especially those where they do not fully return to normal before the onset of the next seizure, should be seen *immediately* either here at the clinic or at an emergency center.

If you have any questions about the information in this handout or any problems with your seizuring pet, please contact Drs. and staff at the clinic.