

# Seizures

## What is a seizure?

A seizure is defined as a paroxysmal, transitory disturbance of brain function that has a sudden onset, ceases spontaneously, and has a tendency to recur. Epilepsy is a recurrent seizure disorder irrespective of cause. Generalized seizures affect the entire body. Most commonly, animals will fall to the side, make paddling movements with the limbs, and often will urinate, salivate and defecate. Seizures usually last less than 90 seconds. Focal seizures remain localized to one body region. Seizures may start focally and then become generalized. Information about where the seizure activity begins is of value in localization of the seizure focus to one side of the brain. The seizure focus is the point in the brain from which the seizure begins.

## What causes seizures?

After the veterinarian is convinced that a seizure disorder is present, the most important question to be answered is whether the seizure focus is the result of primary brain disease (intracranial), the result of a disturbance outside the brain (extracranial), or is occurring idiopathically (without obvious cause). Initially the causes for seizures, should be categorized into those secondary to an intracranial structural cause, an extracranial cause (metabolic), or an unknown cause (idiopathic).

**Metabolic:** Extracranial disease resulting in seizures can be separated into those causes arising within the dog itself (endogenous) for example due to liver disease, or those arising external to the dog (exogenous) such as toxins. There are numerous metabolic diseases that can result in seizures. These include low blood sugar (hypoglycemia), high blood sugar (hyperglycemia), liver disease, kidney disease, electrolyte disturbances, toxins (poisons), anemia, and heart and lung diseases.

**Structural** diseases which result in seizures include hydrocephalus, storage diseases, cancer (primary and secondary brain tumor), inflammatory diseases (infectious and non infectious encephalitis), trauma (injury), and blood-vessel-based diseases. Primary brain cancers originate in the brain whereas secondary cancers develop when cells from cancers outside the brain are carried to the brain in the blood.

**Idiopathic epilepsy** is a seizure disorder without obvious cause. Idiopathic seizures (idiopathic epilepsy) begins between 1 year and 4 years of age. Therefore, a dog that begins having seizures at 9 years of age usually does not have idiopathic epilepsy. Certain breeds of dogs are known or thought to have an increased incidence of idiopathic epilepsy such as beagles, Belgian Tervurens, German shepherds, keeshonds, and collies. High incidence breeds include the Saint Bernard, German shepherd, golden retriever, Irish setter, American cocker spaniel, Wire-haired fox terriers, Alaskan malamutes, Siberian Huskies, and miniature poodles.

## How is a seizure diagnosed?

To search for an extracranial cause for seizures, a metabolic evaluation is performed. The evaluation may include a complete physical examination, blood tests and sometimes x-rays. To search for a mass in the brain an imaging study (CT, MRI) is performed and sometimes cerebrospinal fluid (CSF) is collected. An electrical brain (EEG) evaluation is usually not very helpful, unless it is necessary to localize the seizure focus.

## Treatment of seizures

If an underlying disease can be found, then primary treatment for that disease may help to make the seizures stop. If the seizures are more often than once a month, anticonvulsant medications are often given. The choice of medication depends upon the characteristics of the individual animal's problem. Some of the more commonly used anticonvulsants are listed below. It is important to remember that once an anticonvulsant is initiated, it should not be changed without

veterinary assistance. Most animals with idiopathic epilepsy will require anticonvulsant medication for the rest of their life

### **Drugs Used to Treat Seizures**

- **Phenobarbital** is a barbiturate. It is the most commonly used anticonvulsant. Toxicity signs include drowsiness/sedation, falling, increased drinking, urination and appetite. With high dosages or prolonged use, phenobarbital can cause damage to the liver. Paradoxically, some animals given phenobarbital may become restless and excitable. If this occurs, consult your veterinarian for assistance. For best results, this drug needs to be given consistently (every day) at least twice daily. This drug should not be altered without veterinary consultation. Medication requires routine bloodwork to ensure the proper dosage and minimal side effects to the liver.
- **Diazepam (Valium)** is a benzodiazepine. It is a very effective anticonvulsant, but is metabolized very quickly in dogs, making its effects short lasting. It is given in emergency situations because it works quickly. Acute toxicity includes drowsiness, lethargy, and depression.
- **Potassium Bromide** is used mostly as a secondary anticonvulsant in animals refractory to phenobarbital, however, can be used alone. Due to its lack of metabolism it is the ideal anticonvulsant for patients with liver disease. Acute toxicity includes vomiting, anorexia, constipation, sedation and incoordination. Routine bloodwork is recommended for the proper dosage.

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