

# SEIZURE DISORDERS

## About Seizures

A seizure or series of full body convulsions is an episode of abnormal brain activity usually characterized by loss or altered consciousness, spastic muscle contractions, and sometimes involuntary urination, defecation, and vocalization. Most seizures are generalized **grand-mal** type seizure- similar to those seen in epileptic people. Most seizures are preceded by a period of abnormal behavior including restlessness, and anxious behavior termed the **aura** phase. Seizures are always followed by a **post-ictal** phase characterized by disorientation, ataxia, and sometimes blindness. Duration of the aura and post-ictal phases vary widely between animals- from only a few minutes to several hours.

There are several causes of seizures in animals including epilepsy, cancer (brain tumor), metabolic disorders, head trauma, toxins, infection, and others. Identifying the underlying cause of the seizure is very important to controlling seizures in the future.

Ongoing repetitive seizure episodes require emergency veterinary attention. During a seizure, the animal does not breath properly which causes low oxygen delivery to the brain in turn causing more brain damage triggering more seizures. It is critical to break the seizure cycle to prevent further brain damage.

## Symptoms

- Animal observed seizing
- Disorientation / ataxia
- Sudden blindness- bumping into tables, chairs, corners, etc.
- Urine or stool found in house

## Diagnosis

Most pets present to the veterinarian after they have had a seizure at home. More times than not, the animal is completely normal by the time they are examined by the veterinarian. Occasionally the pets are still post-ictal signs such as ataxia and transient blindness. A thorough physical and neurologic exam should still be carried out blood work run for animals experiencing their first seizures.

- **Neurologic exam-** The veterinarian will test all of the cranial nerve and limb reflexes. The cranial nerves are those that control the eyes, nose, and facial muscles including the tongue and swallowing. Pupils are checked for their response to light, and pupil position is examined. Dogs may be blind after a seizure and thus do not respond by blinking to a hand being waved close to the eye, but will blink when the eyelid is touched lightly. Spinal reflexes testing the limbs are checked as well and should be normal since seizures are secondary to a disorder in the brain, not the spinal cord.
- **Blood work** should always be run to check for other causes of seizures such as a

low blood sugar or calcium, high ammonia, or a high white blood cell count (an indication of infection). If lead exposure is a possibility, a blood lead level should be run.

- **Radiographs** (X-rays) and **ultrasound** can be used to look for cancer, masses, heart disease, and congenital defects if there is any suggestion of these problems based on blood work results or physical / neurologic examination.

If no cause for the seizures can be found with routine tests, the next diagnostic step is to perform either a **CAT scan or MRI of the brain**- both considered the gold standard diagnostic method of choice. The CAT scan and MRI are already commonly used at many large private practice and University teaching hospitals. The scans actually look at the structure of the brain and can identify tumors, bleeds, abscesses, hydrocephalus (water on the brain- a congenital genetic defect), granulomas, skull fractures and other problems.

A consultation with a veterinary neurologist is recommended for all animals in which an underlying problem can not be easily identified or the animal is not responding to anticonvulsant therapy.

In a dog less than 6 years of age, if all blood test results are normal, they are commonly diagnosed with presumed **epilepsy**.

In a dog over 7 with acute onset of seizures, where other diagnostic test results are normal, there is a high probability that a **brain tumor** is developing.

### **Long-term Therapy- Varies widely depending on the underlying cause.**

- **Seizures due to metabolic problems** such as low blood sugar or low calcium resolve when the underlying problem is corrected.
- **Seizures due to epilepsy**- are controlled on a long term basis with medications such as oral phenobarbital and potassium Bromide (KBr). Acupuncture and gold bead implant had also been very successful in treating epilepsy.
- **Seizures due to brain tumors**- are best controlled with the same anticonvulsant medication used for epilepsy, KBr and phenobarbital. Pets can also be given steroids to help shrink the tumor and reduce inflammation associated with a growing mass- however, relief is only temporary and soon the seizures will become refractory to therapy as the tumor grows larger.
- **Brain surgery** is available for pets with brain tumors. A CAT scan or MRI is required to outline the tumor and determine if it is in an operable location. Although most people do not elect this option, there is a good recovery rate making it a good option.

### **Treatment of an status epilepticus (non-stop seizing)**

- Valium- is given intravenous (IV) to stop the seizure
- Phenobarbital is given at high "loading" doses to temporarily increase the blood level for pets already on phenobarbital, or to achieve therapeutic levels in pets that have not received phenobarbital before.
- If a dog has several seizures within a 24 hour period, hospitalization is indicated
- If seizures continue in the hospital or are refractory to phenobarbital loading, the patient will then be placed on a continuous IV drip of pentobarbital or propofol increasing the dose until the pet finally stops seizing. The patient will be left on the drip for approximately 12 – 24 hours after which the pet is gradually weaned off by slowly decreasing the dose over 6-12 hours.

## **Prognosis**

varies widely depending on the underlying cause. Primary seizure disorders caused by epilepsy can be controlled for years with medication. Seizures secondary to other problems carry a guarded to grave prognosis depending on the severity and type of disease.