

# SEIZURES

## About the Diagnosis

**Cause:** A seizure (also called a convulsion or a fit) is caused by excessive, disorganized electrical brain activity that is not consciously controllable. For example, epilepsy is one of many medical conditions that can cause seizures. There are numerous potential causes of seizures in dogs and cats. Broadly grouped, the causes of seizures include problems that are confined to the brain (intracranial causes) and generalized problems affecting the whole body, for which the "weak link," or point through which the symptoms first manifest, is the brain (extracranial causes). Overall, the possible causes of seizures include the following:

### Intracranial:

- Problems with the brain that are present from birth (congenital problems). A common example is hydrocephalus ("water in the brain").
- Infections and inflammation of the brain (meningitis, encephalitis), including granulomatous meningitis-encephalitis (GME), canine distemper, rabies, and many others.
- Interference with the blood supply (infarction) to the brain or bleeding (hemorrhage) in the brain (these "stroke"-type conditions may be caused by various diseases).
- Head trauma and the development of scar tissue in the brain.
- Cancer (neoplasia) developing directly from brain tissue (primary neoplasia) or that has spread to the brain from cancer in another part of the body (metastatic neoplasia).
- Unknown cause within the brain (primary epilepsy).

### Extracranial:

- Exposure to certain toxins, such as when dogs or cats eat certain substances they should not. This includes lead poisoning, chocolate poisoning, antifreeze (ethylene glycol) poisoning, marijuana ingestion, snail/slug bait (metaldehyde) poisoning, pesticide (organophosphate or carbamate) poisoning, and ingestion of some human prescription medications.
- Metabolic problems such as low blood glucose (hypoglycemia) and low blood calcium (hypocalcemia).
- Certain advanced forms of liver disease.
- Many others.

Seizures caused by any of these intracranial or extracranial causes look exactly alike. Furthermore, they may look like other types of events altogether, such as syncope (fainting) or episodic neuromuscular weakness (collapse) that are caused by totally different diseases not necessarily involving the brain at all. Therefore, two crucial aspects for a veterinarian with a patient who has seizures are: to be sure that it is a seizure that has occurred and not a different type of problem and to identify, through blood tests and other evaluations, whether the cause is intracranial or extracranial.

**Symptoms:** Seizures are often preceded by unusual behavior or a mood change that can last for minutes to days. This time period is called the **preictal phase** of a seizure and may or may not escape notice because of its subtle effects. The **aura** lasts for several seconds or minutes immediately before the seizure and is a period of visible behavior change that may include hiding, attention-seeking, restlessness, whining, or howling. The actual seizure is known as **ictus** and can last from a few seconds to several minutes. The most common appearance includes altered consciousness or unconsciousness, falling to the ground and lying on the side of the body, rhythmic muscle contractions such as paddling/jerking/"bicycling motion" of the legs and/or "gum-chewing" motions with the jaws, salivation, urination, and occasionally defecation. There is no responsiveness to verbal commands because the animal is in an altered state of consciousness while this is happening. After a seizure, the **postictal phase** occurs. Some dogs and cats continue to lie on their side for a few minutes, and some fall into a deep sleep. Most are disoriented and may wander around aimlessly and restlessly. They may appear temporarily blind or deaf. These behaviors can last from minutes to hours; rarely do they persist for a day or more.

**Diagnosis:** Your veterinarian will perform a thorough physical exam and take a complete history. Your answers to the veterinarian's questions are extremely important in helping to determine the cause. For example, you may be asked to describe the circumstances and environment surrounding the beginning of a seizure to try to pinpoint an inciting cause. You may be asked about your pet's behavior before and during the seizure, your pet's age when you noticed the first episode, the frequency of seizures, vaccination and medication history, nutrition, any potentially toxic substances in the household, and any traumatic events. These and many other questions help to

confirm that what occurred truly was a seizure and not another type of intermittent event such as syncope (fainting) or neuromuscular weakness and collapse. Sometimes what appear to be seizures occur repeatedly, but the exact symptoms do not allow the veterinarian to be convinced that a seizure and not some other type of episode is occurring, especially since they may not occur in the veterinarian's office where he or she can see them firsthand. In these situations, capturing the event either digitally or on video can be enormously helpful, and you should do this if possible.

In the veterinarian's office, an additional examination to assess the possible causes of the seizures is the neurologic exam. This is a series of simple physical maneuvers such as shining a light in the eyes to assess the response of the pupils, checking the knee-jerk reflex by tapping on the patellar tendons, and so on. Additionally, your veterinarian may dilate the pupils of your pet's eyes and examine the back of the eyes to look for evidence of specific causes. Blood tests, such as a complete blood count (CBC) and routine biochemistry panel, and a urinalysis are important in identifying both the possible sources of the seizure trigger and any damage caused by prolonged, sustained seizures. Specialized, advanced radiology tests such as magnetic resonance imaging (MRI) and computed tomography (CT) of the skull may be required; unlike human medicine, however, MRI and CT for animals require general anesthesia. Your veterinarian will discuss each of these procedures with you if such procedures are necessary. You may be referred to a veterinary specialist for some of these tests. It is important to remember that these tests are aimed at identifying correctable underlying causes for the seizures. If the test results are all negative or normal, then it is assumed that the problem is a biochemical disorder within the brain tissue, which is epilepsy.

## Living with the Diagnosis

A dog or cat diagnosed with a seizure disorder may require lifelong medication, depending on the actual underlying disorder causing the seizures. Sometimes, seizures may continue to occur despite medication, and in these cases, recheck visits are important to make sure that the medication doses are adequate. It is important to keep your pet as comfortable as possible before, during, and after seizures. If you recognize a preictal phase, you can help to prevent injury by not allowing your pet to go up and down steps or to jump on and off furniture, which could be hazardous if the seizure begins at that time. Keep your hands away from the mouth during a seizure to prevent being bitten; during a seizure the animal has no conscious control or recognition during the seizure and may inadvertently bite any hand that is near the animal's face. The old wives' tale of patients "choking on their own tongue" during a seizure is not true, and attempting to handle the tongue of an animal during a seizure poses a great risk to the human and no benefit to the animal. Talking calmly and softly to your dog or cat may help smooth the recovery. Your veterinarian may ask you to describe the event. It is helpful to write down in detail what you see. Include the length of time, specific behaviors, time of day, and possible precipitating events.

## TREATMENT

The goal of treatment is to find the cause of seizures and eliminate it. This is possible in some cases and not others, depending on the specific underlying disorder that is causing the seizures. For example, lead poisoning, liver disease, meningitis, and many other diseases can be treated with medications that reduce or eliminate the cause itself, making seizures less likely to occur. On the other hand, brain tumors that are inoperable will continue to cause seizures because the underlying cause cannot be removed. In these cases, treatment with drugs that make seizures less likely to happen (anticonvulsant drugs) should be considered.

Seizures that occur so frequently that the dog or cat does not regain consciousness between them are called **status epilepticus**. This is a life-threatening condition that requires immediate emergency treatment. If a seizure lasts for 5 minutes or more, take your pet to your veterinarian or to the closest veterinary emergency center. Seizure activity lasting 20 minutes or longer can cause permanent damage to neurons in the brain as well as serious problems throughout the body.

For seizures that occur occasionally, the cause is treated if it can be determined, as mentioned above. If a specific cause cannot be determined, oral anticonvulsant medication can be given to help reduce the number, frequency, and length of seizures. This treatment is not a cure. It is important to understand that seizures may still occur, regular blood tests are required to measure the level of the medication, and medication may be required for the rest of the pet's life. Nevertheless, a seizure is not painful, and the frequency of seizures may decrease over time. Some animals have one seizure and then never have another for the rest of their lives. Therefore, with proper medical attention, a good quality of life is possible with many or most pets with seizures.

## DOs

- Give medicine(s) exactly as directed.
- Share all information regarding your pet's medical history with your veterinarian, including any medication that is currently being given. This information is important to prevent drug interactions and may help to determine the cause of seizures.
- Be sure to have adequate vaccinations given to all dogs and cats on a regularly scheduled basis. Two of the most devastating causes of seizures, canine distemper and rabies, can be prevented with vaccination as long as the vaccines are given regularly and **before** exposure to the disease.
- Videotape or digitally record what you are seeing your pet doing, if there is any doubt about whether it is a seizure or something else.
- Anticipate situations that could cause problems if a seizure develops in the middle of them, and do not let your pet be involved in them if the cause of the seizures has not been completely eliminated. Examples of situations to avoid in pets with chronically recurrent seizure disorders include being in high places (risk of falling if a seizure begins) or swimming (risk of drowning if a seizure begins).

## **DON'Ts**

- Do not change the dosage or stop giving medication without consulting your veterinarian.
- Do not put your hands (or anyone else's) near the face and head of an animal during a seizure, since you risk being bitten very severely (the animal has no conscious control over the bite and may clench with all its strength).

## **When to Call Your Veterinarian**

- If your dog or cat has a seizure that lasts for 5 minutes or longer; be prepared to go to the veterinary clinic if it has lasted this long.
- If you cannot keep a scheduled appointment.
- If you are unable to give medicine as directed.

## **Signs to Watch For**

- Signs of general illness: weakness, lethargy, decreased appetite, weight loss, hiding more than usual, aggressiveness, or other behavior changes. A new onset of these may point to the underlying cause of the seizures and should be reported to your veterinarian.
- Signs that a seizure may occur: subtle mood or behavior changes, restlessness, pacing, whining, and seeking attention.

## **Routine Follow-Up**

- Follow-up visits are required to assess the response to anticonvulsant medication and to measure the level of the drug in the blood. The level is measured each time that a new medication is started and if the dosage is changed.

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