

# Seizures (Convulsions, Status Epilepticus) in Cats

## Basics

### OVERVIEW

- “Seizures” are periods of uncontrolled electrical activity in the brain (also known as “convulsions”); “status epilepticus” is repeated or prolonged seizure activity
- “Epilepsy”—disorder characterized by recurring seizures that originate from the brain
- “Genetic epilepsy”—syndrome that involves only epilepsy, with no demonstrable underlying brain lesion or other nervous system signs; genetic origin proven through family studies, gene isolation or other specific evidence; rare in cats
- “Structural epilepsy”—epileptic seizures are the result of identifiable, structural brain lesions; frequent in cats
- “Idiopathic or Symptomatic epilepsy”—symptomatic epilepsy is suspected, but a lesion cannot be demonstrated; frequent in cats
- Cluster seizures—more than one seizure in 24 hours
- Status epilepticus—continuous seizure activity, or seizures repeated at brief intervals without complete recovery between seizures; status epilepticus can be localized (known as “focal” status epilepticus) or generalized (known as “generalized status epilepticus”)—generalized status epilepticus is a life-threatening medical emergency



### SIGNALMENT/DESCRIPTION OF PET

#### Species

- Cats

### SIGNS/OBSERVED CHANGES IN THE PET

- Localized (focal) seizures with generalization are the most frequent (nonconvulsive generalized)—movements of facial muscles predominate, such as twitches of eyelids, whiskers and ears; drooling; lip smacking; may be associated with whole body trembling/shaking, leg motions, hair standing up (known as “piloerection”), dilated pupils
- Focal seizures—limited to one side of the brain; frantic running, colliding with objects, one-sided face or eyelid twitches, one-sided movement of a limb or the head and neck turning to one side; may generalize
- Generalized tonic-clonic motor seizures—symmetrical on both sides of the body, sustained, repetitive (known as

“tonic-clonic”) contractions of leg muscles on both sides of the body and movement of the head up toward the back; often associated with salivation, urination, and defecation—by the time of admission to a veterinary hospital, the gross motor activity may have stopped, but twitching of the lids and body/limb jerks still may be present

- Injury is frequent—biting of tongue, torn nails or claws
- Mental status, reflexes, and menace response may be abnormal
- Other signs and physical examination findings vary, based on underlying cause of the seizures and the severity of the seizures

## CAUSES

- Pattern of seizures (such as age at onset of seizure activity, type and frequency of seizures) is the most important factor in determining possible causes

### **Extracranial Cause (Disorder Outside of the Head, Leading to Seizure Activity)**

- Metabolic disorder—low blood glucose or sugar (known as “hypoglycemia”), such as from insulin overdose; low calcium levels in the blood (known as “hypocalcemia”) following surgery to remove the thyroid gland (known as “thyroidectomy”); high blood pressure (known as “hypertension”) secondary to kidney transplant; nervous system disorder caused by accumulation of ammonia in the system due to inability of the liver to rid the body of ammonia (known as “hepatic encephalopathy”); very high levels of blood lipids (triglyceridemia); high levels of nitrogen wastes in the bloodstream (uremia); excess red cells with blood sludging (known as “polycythemia”)
- Poisons

### **Intracranial Cause (Disorder Inside of the Head, Leading to Seizure Activity)**

- Anatomic or structural disorder—congenital (present at birth) malformation
- Metabolic disorder—storage diseases (inherited metabolic diseases in which harmful levels of materials accumulate in the body's cells and tissues)
- Tumors or cancer—meningioma, astrocytoma, lymphoma; frequently see gradual change of behavior in days/weeks preceding seizures
- Inflammatory infectious disease—viral diseases (such as feline infectious peritonitis [FIP]), toxoplasmosis, cryptococcosis
- Trauma
- Poisons—insecticides (such as organochlorines, pyrethrins and pyrethroids); chemotherapy drug, chlorambucil, used in lymphoma treatment
- Blood vessel or circulatory disorders—red blood cell (RBC) count above the normal ranges, characterized by the uncontrolled, but orderly production of excessive numbers of mature red blood cells by the bone marrow (known as “polycythemia vera”) leading to sludging of the blood (known as “hyperviscosity”)
- Lack of blood flow to part of the brain, caused by migration of *Cuterebra* larva (known as “feline ischemic encephalopathy secondary to *Cuterebra* larva”)

## RISK FACTORS

- Any forebrain lesion
- Treatment with chlorambucil, a chemotherapy drug
- Kidney failure
- Diabetes mellitus (“sugar diabetes”)

# Treatment

## HEALTH CARE

- Outpatient—isolated recurrent seizures in an otherwise healthy pet
- Inpatient—cluster seizures (more than one seizure in 24 hours) and status epilepticus (repeated or prolonged seizure activity) or isolated recurrent seizures in an ill cat
- Constant medical supervision
- An intravenous (IV) catheter will be established to allow for drug and fluid administration
- Blood will be drawn for rapid measurement of blood gases, glucose, calcium, and levels of anti-seizure drugs (also known as “anticonvulsants”), if pet has been on anticonvulsants

- The veterinary healthcare team will carefully cool the body, if the cat has an elevated body temperature (known as “hyperthermia”)

## **SURGERY**

- Surgical opening of the skull (known as a “craniotomy”)—surgical removal of tumor or cancer (meningioma or other accessible mass)

## **Medications**

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

- Seizure type and frequency determine therapeutic approach

## **ISOLATED RECURRENT GENERALIZED SEIZURES**

- Medications to control seizures (known as “antiepileptic drugs” or “anticonvulsants”)—phenobarbital; second line gabapentin
- Levetiracetam—may be given in combination with phenobarbital
- Initiate medication gradually to avoid overt sedation; follow the directions for medications as directed by your pet's veterinarian

## **CONVULSIVE CLUSTER SEIZURES (MORE THAN ONE SEIZURE IN 24 HOURS) AND STATUS EPILEPTICUS (REPEATED OR PROLONGED SEIZURE ACTIVITY)**

- Treat cluster seizures and generalized status epilepticus early—the pet should be seen at the clinic as an emergency admission
- Medications to control seizures (antiepileptic drugs or anticonvulsants)—phenobarbital, diazepam by injection; treatment plan for administration of medication will be based on status of seizure activity at time of presentation to the animal hospital

## **PERSISTENT SEIZURES**

- Propofol (an anesthetic drug) administered at doses below those needed to induce anesthesia

## **OTHER MEDICATIONS**

- Dexamethasone—a steroid to improve fluid buildup (known as “edema”) in the brain secondary to status epilepticus (repeated or prolonged seizure activity) and to treat the primary cause, if generalized (systemic) infectious disease is not suspected
- Thiamin
- Zonisamide to help control seizures

## **Follow-Up Care**

### **PATIENT MONITORING**

- Bloodwork (complete blood count [CBC], serum biochemistry profile) prior to initiating treatment, and every 6–12 months
- Measure phenobarbital serum level 2 weeks after initiation of treatment; dosage may be changed, based on blood test results; re-measure phenobarbital serum levels periodically until therapeutic range is reached, usually do a CBC 4–6 weeks after starting phenobarbital, and repeat monitoring every 6–12 months
- Bloodwork (creatinine kinase [CK]) to evaluate muscle damage and subtle on-going seizure activity if the cat presented in status epilepticus

### **POSSIBLE COMPLICATIONS**

- In status epilepticus, seizure control may not be achieved
- Rare hypersensitivity to phenobarbital—low platelet count (known as “thrombocytopenia”), low white blood cell count (known as “neutropenia”), itchiness (known as “pruritus”), or swollen feet; “platelets” and “thrombocytes” are names for the normal cell fragments that originate in the bone marrow and travel in the blood as it circulates

through the body; platelets act to “plug” tears in the blood vessels and to stop bleeding

- Diazepam rarely may cause sudden death of liver cells (known as “acute hepatic necrosis”)
- Cardiovascular and respiratory collapse from medications used during treatment for status epilepticus (repeated or prolonged seizure activity)

## **EXPECTED COURSE AND PROGNOSIS**

- Depends on the underlying cause and response to treatment
- Cats with “idiopathic or probably symptomatic epilepsy” have a good long-term prognosis
- Cats can recover despite episode of severe cluster seizures (more than one seizure in 24 hours) and generalized status epilepticus (repeated or prolonged seizure activity)
- Cats with onset of seizure prior to 1 year of age and diagnosed with epilepsy of unknown cause have guarded prognosis for seizure control

## **Key Points**

- Treat cluster seizures (more than one seizure in 24 hours) and generalized status epilepticus (repeated or prolonged seizure activity) early
- Antiepileptic (anticonvulsant) treatment in symptomatic epilepsy may not help until the primary cause is addressed
- Keep a seizure calendar noting date, time, severity, and length of seizures\