

SEIZURES (CONVULSIONS, STATUS EPILEPTICUS) IN DOGS

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
- “Idiopathic epilepsy”—epilepsy of unknown cause; syndrome that involves only epilepsy, with no demonstrable underlying brain lesion or other nervous system signs
- “Symptomatic epilepsy”—syndrome in which epileptic seizures are the result of identifiable, structural brain lesions
- “Probably symptomatic epilepsy”—when symptomatic epilepsy is suspected, but a lesion cannot be demonstrated
- 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” or “non convulsive” status epilepticus) or generalized (known as “convulsive status epilepticus”)—convulsive status epilepticus is a life-threatening medical emergency
- Seizures are classified as “focal” (localized), “generalized,” and “focal with secondary generalization”

SIGNALMENT/DESCRIPTION of ANIMAL

Species

- Dogs

SIGNS/OBSERVED CHANGES in the ANIMAL

- Aura—beginning of a seizure; dog is aware or feeling changes associated with the oncoming seizure—behavioral changes may be seen (such as looking frightened, seeking owner’s assistance, or hiding); aura is not always present; it indicates localized (focal) onset of seizure activity
- Seizure—may start with an aura and progress to a convulsive generalized seizure; dog lies on its side with symmetrical sustained, repetitive (known as “tonic-clonic”) contractions of leg muscles on both sides of the body; often see salivation/drooling, urination, and/or defecation
- Period following the seizure—time of recovery that may last a few minutes to hours; signs include disorientation, confusion, aimless pacing, blindness, increased appetite (known as “polyphagia”)
- Most seizures occur when the dog is resting
- In localized (focal) seizures, the dog is conscious, but mental status may be altered
- Dog may be having seizures, may be normal or may have signs (such as disorientation, confusion) following a seizure at time of presentation to the veterinarian
- 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 of dog 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—low blood glucose or sugar (known as “hypoglycemia”); low levels of calcium in the blood (known as “hypocalcemia”); sudden (acute) kidney failure failure; 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”)
- Poisons

Intracranial Cause (disorder inside of the head, leading to seizure activity)

- Gradual deterioration, leading to loss of function (known as “degeneration”) of the brain—disorder of the brain characterized by changes of aging (known as “senile encephalopathy”)
- Metabolic disease—storage diseases (inherited metabolic diseases in which harmful levels of materials accumulate in the body’s cells and tissues)
- Tumors or cancer—primary tumors (meningioma, gliomas); secondary cancer, due to the spread of the cancer (known as “metastatic cancer”)
- Inflammatory infectious disease—viral diseases (such as canine distemper); fungal diseases; protozoal diseases (such as *Neospora*, *Toxoplasma*); rickettsial diseases (such as ehrlichiosis, Rocky Mountain spotted fever)
- Of unknown cause (so called “idiopathic disease”) or immune-mediated disease—various diseases characterized by inflammation of the brain, spinal cord and their surrounding membranes (the membranes are known as “meninges”), such as granulomatous meningoencephalitis, eosinophilic meningoencephalomyelitis; pug encephalitis; necrotizing meningoencephalitis of Maltese dogs and Yorkshire terriers

- Trauma
- Blood vessel or circulatory disorders—blood clot or bleeding in the brain (known as a “cerebral vascular accident”)
- Epilepsy of unknown cause (idiopathic epilepsy)—age-related, presumed genetic
- Probably symptomatic epilepsy—following inflammation of the brain (known as “encephalitis”) or trauma (scar tissue)

TREATMENT

HEALTH CARE

- Outpatient—isolated seizures in an otherwise healthy dog
- Inpatient—cluster seizures (more than one seizure in 24 hours) and status epilepticus (repeated or prolonged seizure activity)
- Constant medical supervision
- An intravenous (IV) catheter will be established to allow for drug and fluid administration
- Blood should 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
- Carefully cool the body, if the dog 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

Convulsive Cluster Seizures (more than one seizure in 24 hours) and Status Epilepticus (repeated or prolonged seizure activity)

- Treat vigorously with medications to control seizures (known as “anti-epileptic drugs” or “anticonvulsants”)—diazepam, phenobarbital; choice and method of administration of medication based on status of seizure activity at time of presentation to the animal hospital

Persistent Seizures

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

Other Medications

- Dexamethasone—a steroid to improve fluid build-up in the brain (known as “cerebral edema”) secondary to status epilepticus (repeated or prolonged seizure activity)
- Steroids—for treatment of fluid build up in the brain (cerebral edema) secondary to severe inflammatory central nervous system disease, even if caused by an infectious agent
- Potassium bromide—used to control seizures; requires a prolonged period to reach therapeutic levels; therefore, it is not indicated in the treatment of convulsive status epilepticus (repeated or prolonged seizure activity)
- Pentobarbital (an anesthetic drug)—for patients that fail to respond to diazepam and phenobarbital; antiepileptic activity of propofol is superior to that of pentobarbital

Localized (Focal) Status Epilepticus (repeated or prolonged seizure activity)

- Medications to control seizures (anti-epileptic drugs or anticonvulsants)—diazepam, phenobarbital; effective for localized (focal) and generalized seizures
- Potassium bromide—in people, more effective against generalized seizures
- Newer medications to control seizures in people are preferable to older medications, since most are developed to control localized (focal) seizures

FOLLOW-UP CARE

PATIENT MONITORING

- Inpatients—constant supervision for monitoring of seizure activity

POSSIBLE COMPLICATIONS

- Phenobarbital—liver toxicity after long-term treatment; sudden (acute) low white-blood cell count (known as “neutropenia”)—rare side effect, seen in the first few weeks of use; if it occurs, permanently discontinue treatment with phenobarbital (as directed by your pet’s veterinarian)
- Continued seizures, despite adequate serum levels of medications to control seizures (anti-epileptic drugs or anticonvulsants)
- Permanent nervous system deficits (such as blindness or abnormal behavior) may follow severe status epilepticus (repeated or prolonged seizure activity)

- Generalized status epilepticus (repeated or prolonged seizure activity) may lead to elevated body temperature (known as “hyperthermia”), acid–base and electrolyte imbalances, fluid build-up in the lungs (known as “pulmonary edema”), circulatory collapse and death

EXPECTED COURSE AND PROGNOSIS

- Epilepsy of unknown cause (idiopathic epilepsy) represents a large proportion of dogs with generalized status epilepticus (repeated or prolonged seizure activity)
- Dogs with inflammation of the brain and its surrounding membranes (known as “meningoencephalitis”) that develop generalized status epilepticus have the poorest outcome
- Eyelid or lip twitching in a heavily sedated patient is a sign of ongoing seizure activity
- Pet may need 7 to 10 days before returning to normal after status epilepticus (repeated or prolonged seizure activity); vision returns last

KEY POINTS

- Treat cluster seizures (more than one seizure in 24 hours) and generalized status epilepticus (repeated or prolonged seizure activity) early
- Anti-epileptic (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
- Ask your pet’s veterinarian for an in-home emergency plan for cluster seizures

