SEIZURES IN DOGS

Definition:
A seizure (or as it's commonly known) a fit is uncontrolled muscle contractions caused by abnormal brain electrical activity

Signs:
Vary from a minor twitch of a muscle to generalised seizures with loss of consciousness, severe thrashing around, urination and salivation

Advice:
Seeking vet attention is wise. Transport carefully using a blanket under the belly. Do not put your hands in your pet's mouth as they do not swallow their tongues. Prognosis depends on the seizure cause

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
- "Structural epilepsy"—epileptic seizures are the result of identifiable, structural brain lesions
- "Idiopathic symptomatic epilepsy"—structural epilepsy is suspected, but a lesion cannot be demonstrated; unknown cause
- 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 convulsive or non-convulsive;
- Generalized status epilepticus is a life-threatening medical emergency
- Seizures are classified as "focal" (localized to one hemisphere), "generalized (both hemispheres)," and "focal with secondary generalisation"

SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs; status epilepticus is overrepresented in German shepherd dog, English foxhound, Pug, teacup poodle, Boston terrier, Lakeland terrier

Mean Age and Range

- For status epilepticus: average 4.2-5 years (range 0.15-15 years)

SIGNS/OBSERVED CHANGES IN THE PET

- Prodrome—before the seizure—hours or days, no changes in brain activity
- Aura—seconds before beginning of a seizure; dog is aware or feeling changes associated with the oncoming seizure—behavioral changes may be seen (such as looking frightened/lost, seeking owner's assistance, or hiding), has a glazed-over look; indicates localized (focal) onset of seizure activity
- Seizure (ictus)—may start with an aura and progress to a 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; generalized seizures sometimes mild, the animal may remain sitting upright on its chest (sternum) or even standing during the event, can last 20 minutes or more; convulsive or non-convulsive
- Period following the seizure (post-ictal phase)—disorientation, confusion, aimless pacing, blindness, increased thirst (known as "polydipsia"), increased appetite (known as "polyphagia")
- A seizure lasts less than 2 minutes
- Most seizures occur when the dog is resting or sleeping
- In localized (focal) seizures, the dog is conscious, but usually mental status is 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
- In compensated status epilepticus, your dog will have drooling, increased body temperature, fast heart rate, heart rhythm disturbances, increased blood pressure
- In decompensated status epilepticus, your dog will have difficulty breathing, a weak pulse, low blood pressure

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—low blood glucose or sugar (known as "hypoglycemia")—may be associated with an insulin-producing tumor (known as "insulinoma"); low levels of calcium in the blood (known as "hypocalcemia"); sudden (acute) kidney 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—metaldehyde (snail bait), pyrethrins, organophosphates, lead, hexachlorophene, chlorinated hydrocarbons, bromethalin, macadamia nut, chocolate, and mycotoxins

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”)
- Anatomic or structural disorder—congenital (present at birth) malformation
- Genetic epilepsy
- 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; breed-related encephalitis such as Pug, Maltese dogs, Yorkshire terriers and others
- 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)
- Probably symptomatic epilepsy—following inflammation of the brain (known as “encephalitis”) or development of 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; ensure breathing, perhaps saliva suctioning required, oxygen support, possible mechanical ventilation assist
- 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, kidney and liver function, and levels of anti-seizure drugs (also known as “anticonvulsants”), if pet has been on

anticonvulsants; monitoring for appropriate urine output

- The veterinary team will 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

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- Electrolytes corrected with fluid therapy (IV), intravenous sugar (dextrose) and/or oral glucose if low blood sugar identified

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

- Treat with medications to control seizures (known as “antiepileptic 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 buildup in the brain (known as “cerebral edema”) secondary to status epilepticus (repeated or prolonged seizure activity)
- Steroids—for treatment of fluid buildup in the brain (cerebral edema) secondary to severe inflammatory central nervous system disease, even if caused by an infectious agent

ACUTE LOCALIZED (FOCAL) STATUS EPILEPTICUS

- Identify and treat primary cause
- Medications to control seizures (antiepileptic drugs or anticonvulsants)—diazepam, phenobarbital; effective for localized (focal) and generalized seizures; frequently difficult to

achieve seizure control

- Long-term anticonvulsants, if necessary—phenobarbital, Levetiracetam, or Zonisamide

FOLLOW-UP CARE

PATIENT MONITORING

- Inpatients—constant supervision for monitoring of seizure activity
- Vital parameters will be closely monitored; in certain institutions an EEG may be available and so electrical brain activity also monitored

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); rare hyper excitability seen when giving phenobarbital
- Continued seizures, despite adequate serum levels of medications to control seizures (antiepileptic drugs or anticonvulsants)
- Permanent nervous system deficits (such as blindness or abnormal behavior) may follow severe status epilepticus
- Generalized status epilepticus may lead to elevated body temperature (known as "hyperthermia"), acid–base and electrolyte imbalances, fluid buildup in the lungs (known as "pulmonary edema"), circulatory collapse, and death

EXPECTED COURSE AND PROGNOSIS

- Genetic epilepsy or epilepsy of unknown cause (idiopathic epilepsy) represents a large proportion of dogs with generalized status epilepticus or cluster seizures
- Dogs with inflammation of the brain (encephalitis) that develop generalized status epilepticus have poor outcome; if a structural epilepsy, such as *Ehrlichia canis*-associated, the veterinarian may slowly wean the dog off the medication over months if free of seizures for over 6 months; seizures may recur/medication may need to be restarted
- Eyelid or lip twitching in a heavily sedated pet is a sign of ongoing seizure activity
- Pet may need 7–10 days before returning to normal after status epilepticus; vision returns last
- Often seizures do not control well with treatment when age of onset is less than 2 years of age

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 certain types of 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