

Hurricane Animal Hospital
One Davis Court
Hurricane, WV 25526
(304) 562-3321
www.hurricaneanimalhospital.com

How is Epilepsy Treated?

Ideally, we would like to be able to remove the cause of the epilepsy so that the animal will never seizure again. If the epilepsy is symptomatic, sometimes treating the underlying disease (for example, removing the brain tumor) will cure the epilepsy. More often than not, we either can't find the cause (idiopathic epilepsy) or even if we can find and eliminate the cause, some damage has been done and the epilepsy continues. Then we need to use medications to control the seizures.

Goals of Therapy

Antiepileptic drugs do not cure epilepsy; they simply control the seizures. Since we are controlling the seizures rather than eliminating the disease, plan on life-long therapy. The goal of therapy is to decrease the number and severity of the seizures. In particular, we strive to eliminate the clusters of seizures which can create life-threatening situations. Even a well controlled epileptic will have seizures now and then. If we can decrease the frequency and severity of the seizures to a tolerable level without producing side effects of the medication, we consider that a success. Epilepsy is successfully controlled in over 2/3 of the epileptics treated. While not bad odds, that leaves entirely too many patients that still have difficulty with seizure control.

Patience is necessary when treating epilepsy. Antiepileptic drugs are not "one size fits all" medications. They need to be individualized to your pet's specific needs. Often this requires some trial and error to find the medication and dose that works best for your pet. This "perfect balance" may also change with time. When we start medication or alter the dose, it takes time for the drugs to have their maximum effects. There will be some seizures even with the medication, and we need to see how frequently the seizures are occurring to judge just how effective the medication is. Patience is hard to come by when your pet is having terrible seizures, but if your veterinarian advises you that you must wait things out, it may be necessary to do so.

The objective of treating epilepsy is to tip the balance of excitation and inhibition in the brain toward less excitation. The most commonly used drugs in dogs are phenobarbital, potassium bromide, and diazepam. These drugs may be used separately, but sometimes combinations are needed. They all act to increase inhibition in the brain, thus making seizures less likely. This increased inhibition comes at a price, however, and all the antiepileptic drugs may have side effects such as sedation and appetite stimulation.

When do we begin treating?

Any decision to begin a therapy involves weighing the risk of not treating the disease against the risk of side effects of the medication. Many factors weigh into this decision, but in general, if a pet is having more than one seizure every couple months, risk of brain damage and worsening of the epilepsy tips the scales toward treating. If the pet has had clusters of seizures or status epilepticus, then we are very concerned about the risk of a life threatening seizure as well. Other factors we take into consideration include the general health of the pet, the home environment, and economic considerations.

Will I ever be able to stop treating?

Most epileptics require life-long therapy to control their seizures. Occasionally we have animals that can be weaned off medication and don't seize again. These are usually the cases where a cause of the seizures was identified and treated, but sometimes we get lucky with other cases as well. We need to be very patient, though, before deciding that an animal can come off medication. If the medication is doing it's job, the pet may have very few seizures, thus we want to see them go for many months without a seizure before we start to ask if they need medication or not. If we do decide to try withdrawing treatment, we must do so very slowly and be ready to go back if problems develop. Your pet becomes dependent upon the medication and stopping it could precipitate serious seizures.

NEVER DISCONTINUE ANTIEPILEPTIC MEDICATION WITHOUT
CONSULTING YOUR VETERINARIAN!!!

What are Commonly Used Treatments?

All the commonly used medications for epilepsy act in the brain to tip the balance away from excess excitation. The most commonly used drugs include phenobarbital, potassium bromide, and diazepam.

Phenobarbital and primidone

Phenobarbital is probably the most commonly used antiepileptic drug in dogs. In addition to being used on a daily basis to prevent seizures, phenobarbital (or its first cousin pentobarbital) is often used to stop seizures in progress. Primidone is another medication which is actually converted to phenobarbital by the body and thus acts virtually the same way. Phenobarbital is a very effective antiepileptic drug. It is not expensive and comes in a liquid form as well as different size tablets. This makes it easy to come up with the correct dose for everything from a Chihuahua to a Great Dane. It works well in dogs because it stays in the body long enough that it usually only has to be given twice a day.

Most pets have very few side effects on phenobarbital. When we first start

them on the medication, we expect them to be a bit sedated and a little unsteady on their feet, but they usually develop a tolerance to the sedative effects within a few days. Sometimes the dose needs to be increased to control the seizures, and then the dog may have side effects again. The sedative effects are the main reason phenobarbital isn't used more often to treat people with epilepsy. If the child falls asleep at school, or the parent falls asleep driving home from work, that's a problem; if the dog wants to nap in the afternoon, that's usually not so bad.

The other common side effect is a stimulation of thirst and appetite. Decreased activity plus increased food intake, can equal obesity. It is important to watch their food intake so that they don't become overweight.

Phenobarbital is eliminated by the liver and this can take its toll on the liver over time. Some dogs may develop liver damage with long term use of the drug, but many dogs never have any liver problems. Monitoring liver function tests on a regular basis will help avoid potential problems. This liver function test is required to be run every year, with a baseline blood chemistry panel run before your pet starts taking this medication.

Potassium bromide

Bromide was actually one of the first antiepileptic drugs discovered dating back to Victorian times. It was largely abandoned by physicians when phenobarbital was invented because it caused psychological problems in people. It was rediscovered by veterinarians about 100 years after its first use in people and it has proven to be a valuable antiepileptic drug in dogs. Dogs do not appear to suffer the psychological side effects of bromide that people do.

Because it has been around for so long and is seldom used in people anymore, bromide has never received the FDA (Food and Drug Administration) stamp of approval as a drug. Since no one else can patent its use, it is unlikely that any pharmaceutical company will go through the trouble and expense of getting bromide approved. Veterinarians obtain special permission from the FDA to use it. Although it has never gone through the rigorous testing required by the FDA for approval, bromide has been used in dogs for a long time now, and has proven to be a reliable drug.

Bromide is combined with either potassium or sodium (KBr or NaBr respectively) to form a crystal that looks like table salt. This powder can be packaged into capsules, but is much easier to simply mix it with water to form a solution. This solution is very stable and does not need to be refrigerated. The liquid also has the advantage of making adjustments in the dose easy. Since bromide can have bad effects on people, handle it cautiously. Keep the solution away from children and avoid getting the solution on your skin.

Bromide has a very long half life; that is, it takes a long time for the body to eliminate the drug. This means that we usually only need to give the drug once a day which makes it very convenient. It also means that it takes quite a while from when we begin the drug, until we see the maximum benefit of it. We can get quicker results by giving a much higher dose (a loading dose) initially, but

we may see more side effects if we do. So generally we take our time and only do the loading dose when necessary. Because the bromide hangs around so long in the body, we also need to watch the dose and monitor the blood levels to avoid overdoing it.

The amount of salt in the diet can influence how quickly bromide is eliminated from the body. Thus a dog receiving bromide therapy should remain on a consistent, quality dog food diet and salty treats (which includes most table scraps) should be avoided.

Bromide can sometimes cause an upset stomach, and thus it is best given at meal times. The liquid can be mixed with food as long as the dog will eat it all. If the dog is a picky eater, mix the bromide with a little food and wait until that's gone to give the remainder of the meal. Alternatively, simply give the liquid directly into the dog's mouth.

Bromide can cause drowsiness and stumbling like phenobarbital. Usually we only see this when we first begin the medication or at higher doses. The dog usually develops tolerance to the sedation with time, and if not, decreasing the dose can correct the problem. Sometimes the higher dose is needed to control the seizures and then we're faced with deciding between the lesser of two evils. Increased appetite is also common. Rarely skin problems have developed.

Diazepam and related drugs

Diazepam is the generic name for Valium. Most people think of Valium as a tranquilizer, but diazepam is also a very effective drug for treating seizures. The trouble with diazepam is that if it is given daily, it tends to lose its effectiveness over time. As a result, we usually reserve it for stopping a seizure in progress rather than using it as a daily, preventative medication. We occasionally use diazepam or one of the related drugs (clonazepam or clorazepate) on a daily basis, but only when other medications are not working alone.

The best way to give diazepam to stop an active seizure is by an intravenous injection. Diazepam can also be very effective when given per rectum (like a suppository) where it is rapidly absorbed through the membranes. Suppository forms of diazepam are available, but they are fairly expensive, so we usually just use the liquid form that is used for injections. It's not the most pleasant way to administer medication, but this approach can often help dogs that have clusters of seizures. By giving the diazepam at home when the dog begins his cluster, further seizures can often be prevented, thus saving an emergency trip to the veterinarian.

Newer antiepileptic drugs

Many pet owners know a human epileptic who is taking Tegretol, Depakote, Dilantin or other medications for their epilepsy with good success and wonder why those drugs are not used for their dog. Dogs and people are different in ways besides how furry they are and how many legs they walk on. The way a dog eliminates drugs from the body may be very different from a

person. For many of the newer antiepileptic drugs that work well in humans, dogs eliminate them from their bodies much quicker than humans do. Thus in order to receive the same benefits, a dog would have to take the drug more frequently than a person would have to take it. Combined with the high price tag for these new drugs, this often makes them impractical. One of the newer antiepileptic drugs, lamotrigine, can be toxic to dogs even though it is not toxic to people. Still, we are constantly looking for better treatments for epilepsy in dogs, and several are currently being evaluated. Some of the newer drugs which may prove useful in dogs are felbamate, gabapentine, and topiramate, but the jury is still out, and they should only be considered when conventional treatments fail.

Other Treatments

Other treatments are also being looked at for treating epilepsy. These include surgery, vagal nerve stimulation, and special diets.

Surgery will be of definite value if we are dealing with epilepsy secondary to something like a brain tumor where removing the cause might cure the epilepsy. In human medicine, they can sometimes identify a focal source of the epilepsy (the epileptic focus) even when it is not a clear, structural lesion like a tumor. Surgery to remove the epileptic focus is sometimes attempted if these people have intractable epilepsy. While such surgeries have sometimes been successful in humans, they are still experimental in canine epilepsy.

The vagus is a large nerve in the neck that brings sensory information from many of the body's organs to the brain. Stimulating the nerve electrically, much the way a pacemaker is used to stimulate the heart in some heart disease, may help to control epilepsy. This approach is currently being studied to see if it will work in dogs.

In people, a diet very high in certain fats will produce a condition called ketosis and is called a ketogenic diet. The ketogenic diet can help control some seizures in people, but has not yet been shown to help epileptic dogs. Such a diet has to be carefully planned to make sure that other essential nutrients aren't short changed and simply adding excess fat to a dog's diet will make them obese without benefiting their epilepsy.

Side Effects of Antiepileptic Drugs

Most epileptics experience very few side effects of their medication. When side effects do occur, they are usually mild and are far outweighed by the risk of further seizures if we don't treat the epilepsy. Because they increase inhibition of the brain, the drugs tend to be sedatives. This is particularly apparent when the medication is started or when the dose is increased. The dog may be lethargic and want to sleep all the time. The drugs can also affect coordination causing the dog to stumble and weave as if drunk. Most dogs develop a tolerance to the sedative effects of the drugs within a week of beginning them or increasing the dose. Thus if the signs are mild, we will usually try to wait them out and usually within a few days, they improve. Sometimes,

decreasing the dose of the medication is necessary, but we always weight the risk of more seizures into the decision.

NEVER CHANGE THE DOSE OF ANTIEPILEPTIC MEDICATION OR DISCONTINUE IT WITHOUT CONSULTING YOUR VETERINARIAN!!!

The animal on antiepileptic drugs becomes dependent on the medication and sudden decreases in the dose can precipitate serious seizures. When a medication is discontinued, this must be done gradually if the dog has been on it for any length of time.

Occasionally, dogs have a paradoxical reaction to the medication. Rather than becoming sedated, the dog becomes restless, agitated and rarely, irritable. They may pace around the house unable to relax or sleep. Why some animals respond this way is not known, but usually adjusting the dose of medication eliminates the problem.

Another common side effect is an increase in thirst and appetite. The increase in thirst will be accompanied by a need to get outside more often to get rid of the excess water. Due to the appetite stimulation, some epileptics will become obese if allowed to. **DON'T LET THEM!!!** We need to watch their weight and control their diet to keep the weight reasonable. Obesity creates stress on the heart and other organs in dogs, just like it would in people, and an epileptic doesn't need extra stress on their body.

Because we usually need to treat the epilepsy for life, we need to monitor for potentially serious effects of the drugs. Such serious side effects are uncommon, and by watching for them we can often see them coming in time to avoid them. Of most concern is the potential for liver or bone marrow damage by some of the drugs. We have a policy that requires performing liver function tests (such as bile acids or ammonia) and blood counts every year, often more frequently.

Monitoring Blood Levels

Antiepileptic drugs are not "one size fits all" medications. We need to optimize the treatment for your companion's individual needs. There are many things that influence how much of the medication we give the dog is actually available to do the job. By measuring the actual levels of the drug in the blood, we can better fine-tune our treatment to best control the seizures. This is particularly important when we first start the medication or if we are having difficulties with too many seizures or side effects. Even when the seizures are controlled, it is best to measure levels regularly so we have a baseline to compare to and can anticipate problems. The doctors here at Hurricane Animal Hospital require monitoring the blood levels every six months after the initial drug level has been achieved.

Even when a drug is given regularly, there is a bit of a see-saw effect on the levels in the blood. Immediately after we give the medication, the level in the blood climbs as the drug is absorbed. Once it's all absorbed, the level in the blood

gradually falls as the drug is eliminated from the body. The dose is timed so that there is always enough medication in the blood (and hence the brain) to control the seizures. Ideally, the dog's blood levels of medication will fall within the range of levels known to work without causing too many side effects. This is called the therapeutic range. **When measuring the blood levels, we are usually concerned that the level may get too low and allow the dog to seizure. Thus your veterinarian may recommend that you bring your pet in first thing in the morning or last thing in the evening, right before they're due for their next dose. This allows them to measure the lowest, or trough, level.** By measuring trough blood levels, your veterinarian can give you the best advice on how to get the maximum benefit from the medication. **Fasting your pet overnight before the blood tests will prevent fat in the blood from interfering with the accuracy of the tests.** If you have a toy breed dog that is prone to low blood sugar, a diabetic, or other reasons why fasting might create problems for your pet, consult your veterinarian first.

Alternative Therapies

Epilepsy can be a frustrating disease since in a few cases available therapies don't work well or have adverse side effects. This can lead owners to search for alternatives which might better help their pet. These may include treatments such as acupuncture, herbal remedies, homeopathic preparations or magnets. **In the words of one philosopher, "There are only two types of therapies: those that work and those don't."** Labeling a therapy as "alternative" or "conventional," homeopathic," or "allopathic" only sidesteps the real question: Does it work?

Epilepsy can be a highly variable disease. We routinely see epileptics who appear well controlled suddenly have a terrible month and conversely see epileptics who have chronic problems suddenly smooth out and do well for a while. Such variability makes it easy to be fooled into thinking that the treatment is working or not working if we take a too narrow or short term look at a therapy.

As a case in point, we recently evaluated a new treatment for epilepsy that theory and experimental studies suggested might be a good treatment. One of the first dogs we tried it on was a Labrador Retriever who was having severe seizures in spite of everything we had tried before. The dog went 6 months without a seizure and we thought we were on to something. So we tried the treatment on more dogs. It failed miserably from then on out, including the first dog who did so well initially. We can't say why it seemed to work initially, but it was clear by looking at a number of dogs over a period of time, that it wasn't a therapy that worked. Thus the only way to say if a therapy is truly effective or not is to conduct a clinical trial and objectively see how it performs.

Most promotions for alternative therapies rely on testimonials; a few people's stories of how the therapy worked for them. This sort of approach leaves important questions unanswered.

- How was the initial diagnosis established? We've had people bring

in everything from cats in heat to dogs with ear infections and say their pet was having seizures when really something else was going on.

- What criteria was used for "success?" If the dog only went a month or two seizure free, that may just be the natural variation of the disease and not an effect of the treatment.
- How was the "placebo effect" controlled? People want to believe that the new therapy will be the answer for their pet. Thus even if the treatment is a placebo (a sugar pill or some other treatment that has no real effect), you typically see up to 30% of the animals improve. This is simply because we want to believe in the new treatment, and that colors how we look at the results. This is especially true if there is no firm measure of success established, and we rely on a subjective impression of whether the seizures are getting better or not.

"There must be something to this ancient wisdom!"

The herbalist lore began with people's attempts to treat disease with the tool available. Much of our modern knowledge of therapy evolved from these treatments. It was clear that willow bark (aspirin) relieved pain, that foxglove (digitalis) helped heart disease, or that ma huang (ephedrine) relieved congestion. People attempted to explain these observations based on the knowledge of the time and developed theories that the shape of the plant somehow determined what effect it would have or that the treatment altered the flow of some unseen energy or "humor."

Much of this ancient wisdom was, however, founded on ideas that had little basis in fact. Keep in mind that the same ancient wisdom that discovered ephedrine also maintains that rhinoceros horn cures impotence, pushing that species ever closer to extinction. The same ancient wisdom that discovered digitalis also maintained that blood letting was good for just about anything. After a while, people began to realize that blood letting was usually doing more harm than good, and to question why aspirin helped pain and why digitalis helped heart failure. The result was modern medicine where therapy is based on understanding as best we can what is really happening to the body in a disease and doing what we can to maintain health.

That understanding doesn't come easy. It is simpler to fall victim to wishful thinking that there is something mystical to these herbs and treatments that we don't need to understand. Still, we can use what was truly wise from these ancient treatments without turning our backs on the more recent wisdom.

An open-minded clinician doesn't reject a new approach to a problem just because it is different, but a wish clinician does not accept a new approach just because it's different. Some unconventional approaches (e.g. the ketogenic diet) are based on sound reasoning and show promise. There is ongoing research into herbal remedies to see if there are truly active compounds in the plants which could help. In general, however, whenever someone claims to have a new therapy of any kind for epilepsy, be it conventional or not, we take the usual philosophy - "Show me!"

"If it's natural, it must be safe, right?"

Sassafras makes a delicious tea and was recommended as a tonic for a number of ailments. Trouble is, one of the major ingredients in sassafras causes liver cancer in rats. We tend to think of toxins as industrial chemicals, but plants were the original toxin factories. They produce a wide array of toxins either to protect themselves from being eaten, or simply as a byproduct of their everyday living. There is no way to know that this danger exists from looking at the plant, or tasting it, or even seeing what happens to someone who's just drunk sassafras tea. Only by scientific studies was it shown that this danger lurks beneath the sweet taste of sassafras. Granted, people aren't rats, but would you want to bet your liver that we're that much different?

Digitalis was long the mainstay of treating heart conditions, but it wasn't easy. There was a fine line between enough digitalis to help the heart and too much which could kill the patient. Many things can influence how much digitalis is in a foxglove extract. The potency was influenced by everything from the stage of growth when harvested, the weather conditions during growing, and the amount of insect damage the plant suffered; to the way the extract was prepared, and how long it has been stored. Thus extreme care had to be taken to ensure that the amount of digitalis that was given was indeed what we wanted. By looking at how digitalis both helped and hurt, we've been able to develop new drugs which can improve heart disease without some of the risks inherent to digitalis.

While some herbal preparations may be completely harmless, if they truly have effects on the body, there may also be harmful side effects. Drugs are only approved by the Food and Drug Administration after safety studies have established what side effects might be expected from the drug. Such studies are not done for "alternative" therapies and there is no guarantee that they will be safe. We recently saw an epileptic dog who was being treated with an herbal preparation which contained bella donna extract. The active drug in bella donna is scopolamine which has been evaluated by the FDA and shown to cause seizures! Not exactly a wise treatment for an epileptic.

Some alternative therapies, such as acupuncture, massage or magnets, have little potential to do harm in and of themselves. The danger lies in being lulled into rejecting a more rational approach to treating the problem. We tend to take modern medicine for granted and when seizures finally abate, assume it was the acupuncture rather than the phenobarbital that was also used.

So be skeptical of claims for success with epilepsy treatments. Any treatments we recommend for our patients are backed by studies proving their effectiveness and carefully assessing their side effects. Don't settle for anything less.

More Questions?

As always, if you are unsure of what you should do or what is beneficial

for your pet, please don't hesitate to ask your veterinarian. He or she can help you and your pet live a happier, healthier life.

For more information see:

"seizures" handout or "epilepsy" handout