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### Phenobarbital (PB) versus Potassium Bromide (KBr)

In deciding which of the 2 anticonvulsant (anti-seizure) medications to try first, I would go with the one that your veterinarian feels most comfortable with. Both Phenobarbital (PB) and Potassium Bromide (KBr) are excellent, and both are reasonably safe, but each has their advantages and disadvantages. Sodium Bromide (NaBr) is very similar to KBr, although the recommended dosage is different.

Of course, all medications (and all "natural" treatments) can have side effects, and this handout makes that clear. However, with anticonvulsants, the side effects generally are outweighed by the advantages of controlling your dog's seizures. Of course, each dog reacts differently. I'll give you an outline of the pros and cons of each medication, but be sure to discuss this with your veterinarian.

Phenobarbital (PB) should show the effect more quickly because it usually takes only 2 weeks for a particular dose to reach a stable level in the dog's blood. Of course, you may find that the starting dose isn't high enough, but this should be apparent more quickly with PB than with potassium bromide (KBr). PB also is slightly easier to administer since it is available in pill form and it is available from regular pharmacies.

The main disadvantage of PB is that when used long-term, some dogs will show liver problems. Thus, it is important to monitor the dog's liver functioning on a regular basis. (Most recommend every 6 months.) If you monitor your dog's blood regularly, you should be able to catch any liver problems before they become serious, and then you can switch to potassium bromide, which does not hurt the dog's liver. I should note though that in a small number of cases, the liver problems are not caught in time, and the damage is not reversible. These cases are not common, but they do occur and the result can be fatal. The other disadvantage is that dogs generally need to be dosed at regular 12 hour intervals (for example, 7 AM and 7 PM). Depending on the predictability of your work schedule, this may or may not be a problem. Some dogs do fine if the owner is an hour or so early or late, but some dogs need the regularity of a dose every 12 hours in order to get good seizure control. In some very rare cases, a dog will show some blood abnormalities as a reaction to PB. However, these are very rare "idiosyncratic" reactions and are not related to the dose of PB. Also, these effects are reversible if you stop the PB.

The main advantage of potassium bromide (KBr) over PB as the first drug of choice is that (as mentioned), KBr does not hurt the liver. KBr was the very first anticonvulsant used with human epilepsy in the mid and late 1800s, but it no longer is used with humans because there are many more highly effective drugs that work with people.

Unfortunately, most of these human drugs do not work with dogs because the dog's liver metabolizes them so quickly that you would have to dose your dog every few hours. And many are extremely expensive. Still, if neither PB nor KBr works well enough, there are

a couple of these new drugs that can work with some dogs, but they wouldn't be a good starting drug.

Another advantage of KBr is that you don't need to stick to such a strict dosing schedule. In fact, from a seizure-control viewpoint, you could easily dose just once each day. The main reason you may want to dose twice daily is to break up the medication because a high dose at one time can upset the stomach and it tastes bad. So dogs seem to do better with KBr when it is given twice daily with some food. (For my own Standard Poodles with epilepsy, I mix the KBr into a small bowl of instant oatmeal-cooled off. Another good method is to drop the liquid into a piece of bread.) But as I said, you don't need a strict time schedule.

A disadvantage of KBr is that it takes longer to show its true effect. That is, it takes longer to stabilize its level in the blood so you may not know the true effect of a particular dose for 3 or 4 months. This does not mean that your dog won't show any improvement for 3 or 4 months. Many will show some improvement within a few weeks. However, you won't know what the "full" effect will be until the level of KBr has stabilized in the dog's blood, which takes a few months. So finding the right dose and schedule is likely to take longer than with PB. Still, it is very manageable. However, when dogs are having very frequent or very severe seizures, you want to get the seizures under control more quickly. In this situation, some veterinarians will begin with a very high dose of KBr (called a "loading dose"). The use of a loading dose and how it compares to a regular maintenance dose for KBr is discussed on the following web site: [http://www.cvm.tamu.edu/vcpl/publications/Kbr\\_handout.htm](http://www.cvm.tamu.edu/vcpl/publications/Kbr_handout.htm)

A drawback of using such a large "loading dose" is that the side effects can be extreme. Thus, when dogs are having seizures that need to be controlled right away, it might be better to start with PB, and then later switch to KBr if that is the preferred medication.

A very small number of dogs react so badly to KBr that they become almost psychotic. They may run around all night screaming, for example. However, when this occurs, not only is it very rare, but it is completely reversible. That is, if you stop the drug immediately, you will see improvement pretty quickly and there are no lasting effects. Once the medication clears the dog's system, the dog is just fine. Also, for those small number of dogs who react that way, you will see this reaction shortly after you begin the drug. It is not something that could come out of the blue after you have been using the drug for a while.

Some veterinarians have reported that pancreatitis (inflammation of the pancreas) seems to be more common in dogs taking bromide. However, despite these reports, no one has proven that the higher rates of pancreatitis are actually caused by the bromide. In other words, it is not clear if it is the bromide that is causing the problem or something else that these particular dogs are doing. (For example, one might speculate that since bromide tastes bad, many owners give their dogs very tasty, high fat treats to get them to take the medication. So it could be these extra high fat treats rather than the bromide itself that cause the pancreatitis.) Also, there is no good explanation for why bromide might affect

the pancreas this way. Still, the fact that pancreatitis is more common in dogs taking bromide suggests that it would be a good idea to monitor the dog for this.

KBr is a little harder to obtain since it is not available in regular pharmacies. It must be compounded by a compounding pharmacy. Most towns have one of these, or you can get it mail order. Sometimes, mail order gives the best price. You just have to check and compare prices with what the compounding pharmacy in your area charges. If you go to this web site <<http://www.canine-epilepsy.com>> there is a section on mail order pharmacies. KBr comes in liquid form, although you can order capsules made up once you find the right dose. However, capsules are more expensive and you have no ability to make small changes in dose if you need to. So I prefer the liquid.

Another thing to keep in mind when using KBr is that you should not change their diet in any major way once you have found the right dose of KBr. This is because bromide competes with the chloride in their diet. (Note I said chloride--not sodium.) What this means is that if you noticeably increase the amount of chloride in their diet, this will cause more bromide to be eliminated in their urine, which can lead to seizures if the bromide level gets too low. In contrast, if you change their diet to one with noticeably less chloride, this will cause the bromide level in their blood to increase, which can lead to more serious side effects. It doesn't matter whether the dog is getting a lot of chloride or only a little bit of chloride in his diet. What's important is that you don't change their diet in any major way. Giving a new kind of treat now and then shouldn't hurt anything, but changing dog foods can make a difference if the old and new diets differ a lot in their chloride content. (All food companies should be able to provide chloride content information if you call their customer service department.) Interestingly, a recent study raised the possibility that major changes in dietary protein and fat can influence the level of phenobarbital in the blood. So whether you use KBr or PB, you should monitor what happens to the blood level of the drug in the event that you make major changes in the dog's diet (see next paragraph).

Importantly, with both drugs, you should monitor the dog's blood level regularly to be sure that the amount of the drug that remains in his blood is within the "therapeutic range." This is the range within which the majority of dogs will show a beneficial effect on their seizures without showing unacceptable side effects. Some dogs do best at the very low end of this range, but others need to be at the very high end. So the decision to raise, lower, or keep a dose the same needs to be based on consideration of both the blood level of the drug and how the dog is doing clinically in terms of having the seizures under control and not showing unacceptable side effects.

The primary side effects of both drugs are sedation and weakness in their legs (which often is most noticeable in the rear legs). However, this often goes away once the dog's system gets used to the drug. It can take a few weeks from the time he starts the drug or has an increase in dose. If these effects do not subside in a few weeks (or if these side effects are so strong that they are intolerable), try lowering the dose a small amount. A few dogs react in the opposite way and become more excitable and restless when they

begin taking these medications. Like the sedation, this often resolves in a few weeks, but in some dogs will require a change in dose.

Other common effects of both medications include increased appetite, so you will need to watch your dog to be sure that he doesn't eat more than he needs. If owners do not watch their dog in this respect, they can gain a lot of weight because they can act as if they are starving. Also, they tend to urinate more and drink more. So they may need to go outside more frequently to avoid accidents. Of course, as I keep saying, each dog reacts differently, and you just have to wait and see how yours reacts.

In summary, when deciding whether to use PB or KBr, both drugs are excellent choices. In this handout, I have emphasized all the difficulties that can accompany each medication because I think that owners should be fully informed. However, I again want to emphasize that the advantages of controlling your dog's seizures generally outweigh the disadvantages of medication (unless your dog is having only 1 or 2 mild seizures per year). Also, some dogs that become seizure-free on these drugs can later be weaned off medication. With human epilepsy, it is recommended that the patient wait until they have been completely free of seizures for 2 years. I also would encourage dog owners to wait at least two years before they try to wean their dog off anticonvulsants, and I encourage you to wean them VERY SLOWLY. I was never able to wean either of my two epileptic Standard Poodles off of medication, even after 2 years of being seizure-free. However, several of our research participants reported that after weaning their dog off medication, he or she remained seizure free.

When using any anticonvulsants, it is a good idea to keep a record of whenever your dog has a seizure (or suspected seizure). That way, if the dog starts to show a small improvement from medication, you will be able to tell more easily. Use whatever system is best for you, but I like to have a calendar with space by each day for writing notes. I keep the calendar readily available so I can easily write down whenever an episode occurs. You want to write the time of day and any other descriptive information that occurs to you. For example, if the episode was particularly severe or mild, or long or short, and what kind of movements or behaviors your dog showed. After several weeks have passed, you can, if you wish, make a graph of how many seizures he had each week so you can more clearly see if they are decreasing.

It sometimes takes a long time to see improvement with anticonvulsants. For some dogs, it can take many months to get the seizures under control. Sometimes, you may need to raise the dose several times and/or add or substitute a second anticonvulsant before you see improvement. So lots of patience, a willingness to try different things, and careful monitoring of the dog's blood (to see if the level of medication that remains in his blood is within the "therapeutic range") may be necessary for success. However, some dogs respond to anticonvulsants very quickly. That is, they show a dramatic decrease in seizures within a couple weeks of starting medication. It is impossible to know ahead of time how an individual dog will respond. But patience pays off!

Don't hesitate to contact us if you have questions.

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