Optimal Antiepileptic Therapy in Canine Epilepsy

Written by Muriel Cunningham

It is important to accurately diagnose and treat seizure disorders because prolonged seizure activity can result in brain damage. Patricia Dowling, DVM, MSc, Western College of Veterinary Medicine, Saskatoon, Saskatchewan, Canada, gave a presentation regarding best practices in treating dogs with epilepsy. Pharmacotherapy is typically recommended in dogs having seizures more than once a month, those having >1 seizure per day, or those presenting with status epilepticus. Phenobarbital and potassium bromide (KBr) remain the most effective antiepileptic drugs in dogs. Characteristics of both drugs are summarized in Table 1. Dr. Dowling emphasized that when a treatment strategy is devised, the expectations of the owner must be considered. Owners must understand that their dogs will continue to have seizures while on medication and that the objective is to decrease seizure frequency, duration, and severity.

Phenobarbital is often the first-line treatment of seizures in dogs, with KBr added if needed. A typical slow-induction dosing regimen is phenobarbital, 2 to 4 mg/kg/d, divided every 8 or 12 hours. If necessary, the phenobarbital dose may be increased to 18 to 20 mg/kg/d divided every 8 or 12 hours. Phenobarbital is primarily metabolized by the liver and induces microsomal P-450 enzymes in dogs within days of starting the drug. This induction can affect concurrently administered drugs. If treatment needs to be stopped, phenobarbital should be tapered by decreasing the dose by 10% to 25% every 2 weeks. However, in cases where the dog has serious adverse effects, the drug must be stopped abruptly. Given the long half-life of phenobarbital, dogs generally do not experience withdrawal symptoms or breakthrough seizures.

KBr is used as an add-on to phenobarbital or as a monotherapy alternative in dogs that cannot tolerate phenobarbital. KBr is renally eliminated and does not undergo hepatic metabolism, so it is useful in dogs with liver disease. The typical starting dose for dogs on a normal commercial dog food diet is 20 mg/kg divided every 12 hours in food to reduce nausea. When KBr is given as monotherapy, the starting dose is 40 to 50 mg/kg/d, although some dogs may require higher doses to achieve seizure control. In dogs with renal insufficiency, half the recommended dose of KBr should be administered, and drug concentrations should be frequently checked.

KBr doses of 50 to 80 mg/kg/d may be needed in dogs on a high-salt diet to maintain adequate serum concentrations. Bromide and chloride compete for renal tubular reabsorption, so the bromide elimination rate is greater in dogs with high chloride intake. The chloride content of commercial dry dog food varies from 0.45% to 1.09%, and prescription diets may be even higher. Owners

Peer-Reviewed
Highlights From the

American Veterinary Medical Association 2014 Annual Meeting

July 25–29, 2014
Denver, Colorado

Table 1. Phenobarbital and Potassium Bromide Characteristics in Dogs

Characteristic	Phenobarbital	Potassium Bromide
Therapeutic range	15–45 μg/mL (70–175 μmol/L)	Combined with phenobarbital: 1000-2000 μg/mL (10–20 mmol/L) Monotherapy: 3000 μg/mL (30 mmol/L)
Elimination half-life	37–75 hours (mean, 53 hours)	24 days
Time to steady state	Approximately 2 weeks	4 months
Therapeutic drug-monitoring recommendations	Wait at least 2 weeks for initial testing	30 and 120 days after starting treatment and every 6 months thereafter
Adverse effects	Sedation, polyphagia, polyuria, behavioral changes, blood dyscrasias, hepatoxicity, superficial necrolytic dermatitis	Sedation causing mental depression, incoordination, pelvic limb weakness or stiffness, pancreatitis, pruritic skin lesions, irritability, aggression, attention-seeking behavior, aimless pacing, house soiling

should therefore be cautioned to not change their dogs' diets while on KBr therapy and to avoid giving salty treats. Swimming in the ocean has also been associated with breakthrough seizures in some KBr-treated dogs.

Expanding the Use of Endoscopic Procedures Encouraged

Written by Muriel Cunningham

MaryAnn G. Radlinsky, DVM, University of Georgia, Athens, Georgia, USA, gave a presentation in which she encouraged veterinarians to consider using endoscopy for more procedures. In addition to providing a clear view of internal structures, endoscopic procedures can reduce morbidity and damage to target sites and lead to more rapid recovery times. The equipment consists of a tower that includes a strong light source, a high-definition camera, a capable image processor, and recording equipment. In addition, instruments on a long, narrow delivery system must be used for sampling or treatment.

Several types of endoscopic procedures were reviewed. Rhinoscopy requires control and patience. Dr. Radlinsky emphasized that small, deliberate movements are imperative for any endoscopic procedure. This is particularly true during rhinoscopy because any misguided movements in these rigid surroundings can result in hemorrhage. A 30° endoscope will enable the veterinarian to visualize structures within the confines of the nasal cavity. Biopsies can be obtained with the small biopsy channel, but better samples are obtained with forceps passed adjacent to endoscope. To avoid aspiration pneumonia, Dr. Radlinsky recommended using a properly sized endotracheal tube with a functioning cuff inflated to 20 cm H_2O. While the use of the angled endoscope will take some practice, Dr. Radlinsky believes that it is worth the effort.

Cystoscopy can also be performed endoscopically. It is very important to visualize the lumen at all times to avoid perforation to the tract. Dr. Radlinsky further stressed that fluid cannot be under pressure during irrigation, as this will cause severe diffuse trauma and hemorrhage to the bladder. This is another procedure that is best performed with the angled endoscope. Since small biopsy samples are taken via the channel, many must be made to obtain an accurate diagnosis. Veterinarians can move on to therapeutic procedures, such as calculi removal and the treatment of small polyps, once they have mastered diagnostic cystoscopy.

Performing otoscopy with an endoscopy tower has several advantages. The video otoscope works very well for ear flushes and deep ear cleanings and is faster than typical methods. Biopsies can be obtained; stricture, hyperplasia, neoplasia, and foreign bodies can be diagnosed; and polyps can be removed. The risks with otoscopy include tympanic membrane rupture, middle ear hemorrhage, and deafness.

Performing laparoscopy and thoracoscopy requires the development of many new skills. These abilities include the safe placement of ports without damaging internal organs, triangulation, organ manipulation, and hemorrhage control. Appropriate monitoring equipment is required as well. Veterinarians must be comfortable with the open procedure before moving on to endoscopic procedures, and it is best to start with diagnostic procedures, such as collection of samples. Dr. Radlinsky emphasized that these skills are achievable, and she encouraged veterinarians—particularly those who have already invested in endoscopy equipment—to obtain adequate training and perform procedures regularly to maintain their expertise.

Multimodal Analgesia in Field Restraint

Written by Muriel Cunningham

Hans Coetzee, PhD, Iowa State University, Ames, Iowa, USA, gave an overview of multimodal analgesia in large animal field restraint. The opioid nalbuphine has several advantages as an alternative to butorphanol. Because nalbuphine is an opioid κ agonist/μ antagonist, it has very low abuse potential. It is currently a nonscheduled drug in the United States except in Kentucky where it is scheduled because of abuse potential in equines. It is also less expensive than butorphanol, costing $2.50 per mL compared with $8.60 per mL for butorphanol. In addition, its use is not associated with any cardiovascular, respiratory, or gastrointestinal adverse effects. All opioids, including nalbuphine, have very short half-lives in ruminants. "Opioids in my experience have not necessarily been my mainstay analgesic drug when it comes to ruminants. I use them as an adjunctive therapy in combination with xylazine and ketamine," Dr. Coetzee said.

The Ketamine Stun is a combination of the dissociative anesthetic ketamine and the α-2 agonist xylazine, with butorphanol added if needed. For large groups of cattle, a stock solution for a standing stun can be made (Table 1). This solution should not be stored for future use.

This combination can be modified if a recumbent stun is needed, as follows: xylazine 0.025 to 0.05 mg/kg (same as standing stun), butorphanol 0.05 to 0.1 mg/kg (10 × standing stun), and ketamine 0.3 to 0.5 mg/kg intravenously (IV; 5 × standing stun). Animals become recumbent gracefully in approximately 1 minute and the effect lasts for 15 to 25 minutes. For 15 minutes of anesthesia,