Despite advancements in standard therapies, intracranial tumors remain a significant source of morbidity and mortality in veterinary and human medicine. Several newer approaches are gaining more widespread acceptance or are currently being prepared for translation from experimental to routine therapeutic use. Clinical trials in dogs with spontaneous brain tumors have contributed to the development and human translation of several novel therapeutic brain tumor approaches.

Impaired states of consciousness can be relatively easily identified, although it can occasionally be difficult to assess whether there is a pure disorder of wakefulness or awareness. Regardless, such impairments represent dysfunction of the brainstem and or cerebrum. Acute and severe impairments of consciousness can require immediate assessment, in part currently performed using the modified Glasgow coma scoring system, and emergency stabilization. The prognosis is always guarded and highly sensitive to the underlying etiology.

Glucocorticoid drugs are frequently used nonspecifically by veterinarians to control clinical signs associated with central nervous system disease. However, this use is infrequently justified and can also be associated with detrimental long-term patient outcomes. First, there are few diseases for which glucocorticoids are the preferred or definitive treatment. Second, their actions may blunt subsequent diagnostic efforts, for instance, by altering MRI appearance or cerebrospinal fluid cell content, or lead owners to abandon pursuit of more appropriate therapies if they perceive the first-line steroid therapy to be a failure.

The hereditary ataxias are a group of neurodegenerative diseases that cause a progressive (or episodic) cerebellar ataxia. A large number of different disorders have been described in different breeds of purebred dog, and in some instances, more than one disorder occurs in a single breed, creating a confusing clinical picture. The mutations associated with these disorders are being described at a rapid rate, potentially changing our ability to prevent, diagnose, and treat affected dogs. A breed-related
neurodegenerative process should be suspected in any pure bred dog with slowly progressive, symmetric signs of ataxia.

**Canine Paroxysmal Movement Disorders**

Ganokon Urkasemsin and Natasha J. Olby

Paroxysmal dyskinesias are episodic movement disorders characterized by muscle hypertonicity that can produce involuntary movements. Signs emanate from the central nervous system; consciousness is not impaired, ictal electroencephalography is normal, and there are no autonomic signs, distinguishing them from seizure disorders. In humans they are classified into 3 groups, each responding to different therapies. A mutation in the gene for brevican (BCAN) has been identified as the cause of Episodic Falling in Cavalier King Charles spaniels. Further elucidation of the genetic causes will enhance our ability to identify and treat these canine diseases.

**Status Epilepticus and Cluster Seizures**

Edward (Ned) E. Patterson

Status epilepticus (SE) is a medical emergency for companion animals, with significant associated morbidity and mortality. Therapy in companion animals and people has been largely with sedatives and anesthetics, many of which have gamma-aminobutyric acid receptor-mediated mechanisms. Early aggressive treatment includes staged first-line therapy with benzodiazepines, and second- and third-line protocols when needed. Recently, intravenous levetiracetam has also been used in for SE in dogs and people, and there are other human intravenous drug preparations that may hold promise for future use in companion animals.

**Aging in the Canine and Feline Brain**

Charles H. Vite and Elizabeth Head

Aging dogs and cats show neurodegenerative features that are similar to human aging and Alzheimer disease. Neuropathologic changes with age may be linked to signs of cognitive dysfunction both in the laboratory and in a clinic setting. Less is known about cat brain aging and cognition and this represents an area for further study. Neurodegenerative diseases such as lysosomal storage diseases in dogs and cats also show similar features of human aging, suggesting some common underlying pathogenic mechanisms and also suggesting pathways that can be modified to promote healthy brain aging.

**Acute Spinal Cord Injury: Tetraplegia and Paraplegia in Small Animals**

Nicolas Granger and Darren Carwardine

Videos of: (1) extension of the digits in response to stimulation of the plantar surface in a dog following severe SCI; (2) 5-year-old male neutered paraplegic Dachshund showing evidence of neuropathic pain around the lesion site; (3) and 8-year-old female neutered Jack Russell terrier following a road traffic accident and complete luxation of the C5-C6 vertebrae accompany this article

Spinal cord injury (SCI) is a common problem in animals for which definitive treatment is lacking, and information gained from its study has
benefit for both companion animals and humans in developing new therapeutic approaches. This review provides an overview of the main concepts that are useful for clinicians in assessing companion animals with severe acute SCI. Current available advanced ancillary tests and those in development are reviewed. In addition, the current standard of care for companion animals following SCI and recent advances in the development of new therapies are presented, and new predictors of recovery discussed.
Inherited Neurologic Disorders in the Dog: The Science Behind the Solutions 1223
Cathryn Mellersh

Canine inherited neurologic diseases are clinically varied and can be congenital, neonatal, or late onset as well as progressive or stationary. Modern genetic technologies are revolutionizing the speed and efficiency with which mutations responsible for inherited neurologic disease are being identified. Clinically similar disorders can be caused by different mutations, even within a single breed, and are thus genetically distinct. DNA tests can be used by dog breeders to reduce the prevalence of inherited neurologic disorders in specific breeds and help the veterinarian diagnose disease.

Neuronavigation in Small Animals: Development, Techniques, and Applications 1235
Fred Wininger

A persistent obstacle to accurate diagnosis and treatment of brain disease has been the difficulties in safely obtaining representative biopsy material in a live patient. Major problems are the variability in the anatomy between individuals and the inability to reliably locate deep structures through reliance on surface anatomic features. Although stereotaxic devices have been available for many years, they have now been supplanted by frameless systems, which are more accurate and less cumbersome and allow good surgical access and provision of intraoperative feedback of instrument location.

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