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The symptoms and causes of seizures in cats have little comparable to that of the dog. Most cats with seizure activity have symptomatic or probably symptomatic epilepsy. To ease understanding, some important definitions are included. In the context herein, the epilepsy is idiopathic when there “is only epilepsy, without underlying structural brain lesion or other neurological signs or symptoms; idiopathic epilepsy is presumed genetic and usually age dependent”1,2. The epilepsy is symptomatic when “the epileptic seizures are the result of one or more identifiable structural lesions of the brain”1.2. The epilepsy is probably symptomatic when “the epilepsy is believed to likely be symptomatic but no etiology has been identified”1,2. Keeping in mind these definitions, most cats with recurrent seizures have symptomatic or probably symptomatic epilepsy.

SEIZURE PATTERNS

The most frequent types of seizures in the cat are the focal seizures, with or without secondary generalization. The seizures is classified as focal when there is no loss of consciousness even though the mental status may be altered. The focal seizure may be violent, the animal propelling itself in the air, running and colliding with objects, biting its tongue, avulsing its claws, etc. The seizures may also be subtle and not recognized by the owners as seizure activity. In these cases, there is frequently repetitive ear, eyelid or whisker fluttering and twitching. Occasionally, cats admitted to the intensive care unit with on-going seizure activity continue to seize even though they seem deeply sedated by the antiepileptic treatment; when touched, their muscle mass is vibrating with activity. The muscular necrosis can be marked in these patients (creatine kinase > 50,000U/L). With generalized seizure, there is loss of consciousness. Generalized seizure is a pattern of the seizure that is convulsive, with tonic-clonic movements, salivation and urination.

The seizure pattern plays a crucial role in establishing the differential diagnosis and in orienting the antiepileptic treatment. The seizure pattern includes (1) the age of the patient at onset of seizures, (2) the seizure type (focal, generalized, or focal with secondary generalization) and (3) the seizure frequency.

CAUSES OF SEIZURES

The history, signalement and seizure pattern are the most important elements toward establishment of the differential diagnosis. Most seizures in the cat are intracranial in origin. Rare are the seizures resulting from toxicities or metabolic diseases. In a descriptive study by Millonig and coworkers, polyneuritis was the only metabolic disease reported as a cause of seizures.3 In these cats, the cause of the seizures was not the metabolic effect of the disease per se, but the vascular events that resulted from the hyperviscosity. In the same study, the most common causes of seizures were the viral encephalitides. The viral non-felisnfectious peritonitis (FIP) encephalitides are common causes of seizures in the young to middle-aged cat. The seizures may be preceded by mild unsppecific transient systemic signs such as fever, anorexia, cough, vomiting, and diarrhea up to three weeks prior to the onset of the seizures with the animal being clinically normal by the time the first seizure is observed. The seizures onset is often frequent progresses rapidly over a few days. The disease is often self-limited but the resulting lesion may be highly epileptogenic in reason of its evolution, with frequent focal and/or generalized tonic-clonic seizures occurring as clusters and status epilepticus. On the biochemical profile, there is often a marked increase in creatine kinase (CK) due to the constant muscle tremors/shaking these cats experience.

Feline infectious peritonitis is likely if the cat is less than three years of age, has a protracted history, systemic signs and neurological disease. Central nervous system infection with Cryptococcus has similar presentation but is observed in a wider range of age. These infectious diseases are rare compared to the viral non-FIP encephalitides. Feline leukemia virus (FeLV), feline immunodeficiency virus (FIV) and toxoplasma organisms are rare causes of neurological disease in the cat.

Ischemic encephalopathy may also lead to epilepsy in the cat but the seizures may be infrequent and may not necessitate antiepileptic treatment. The outcome is usually good if the animal survives the initial cerebral ischemia. A few cats never display signs characteristic of feline cerebral ischemia. On these cats, the presumptive diagnosis is made on magnetic resonance imaging (MRI) of the brain demonstrating bilateral but asymmetrical atrophy of the cerebrum. Many metabolic/endocrine diseases in cats (renal failure, diabetes mellitus, and hyperthyroidism) cause hypertension; however, for the frequency of these diseases in the aged cat, ischemic events are comparatively rare findings.

Brain tumors, especially meningiomas, are frequent causes of seizures in the cat > 10 years of age. In all, there is a behavioral component that often, unfortunately, is unnoticed by veterinarians and misinterpreted by owners as “old age”. Meningiomas are relative easily to remove surgically. Recurrences are frequent especially if the removal is not complete.

Young cats (6 - 12 months) that develop recurrent seizures and in which the neurological examination and ancillary tests (MRI, cerebrospinal fluid analysis) are unremarkable often have epilepsy that becomes intractable. A retrospective study has reported however that those young epileptic cats live generally longer.4 DIAGNOSTIC WORK-UP

There is benefit to the patient into categorizing its epilepsy as “probably symptomatic” when the seizure pattern detracts from idiopathic epilepsy and when, a thorough diagnostic work up has failed to identify a cause for the seizures, because it forces the clinician to diagnostically reevaluate the patient every single time the patient is presented to the office. The diagnostic work up advocated in all cats with seizures includes: physical, neurological and funduscopic examinations, CBC, biochemical profile (with CK and T4 measurements), FeLV, FIV and urinalysis, thoracic radiographs (3 views) and abdominal ultrasound, and, magnetic resonance imaging of the brain and cerebrospinal fluid analysis. The FeLV and FIV tests are done, not to eliminate causes of seizures, but as part of the patient’s general health evaluation.

TREATMENT

Treatment failure in a great majority of cases results when the wrong diagnosis is posed, the wrong treatment applied, the wrong antiepileptic drug (AED) chosen or, when the AED is used inadequately. The biggest deterrent to an improved seizure control is the overt diagnosis of idiopathic epilepsy. Treating the seizures alone in a cat with encephalitis or tumour is doomed to fail. As an example, the seizures in a cat with cerebral meningioma are more likely to be controlled if the peri-tumoral oedema is addressed. Moreover, the choice of AED is based on the type of seizures present. Focal seizures or seizures with focal onset are more likely to respond to treatment when an AED that targets this type of seizures is used. Focal seizures can be very difficult to abate. It is also important to use the AED adequately measuring serum levels whenever available. Although guidelines exist, the antiepileptic treatment must be customized to the patient and to the owner’s lifestyle.

There are many AEDs available to treat seizures in cats. It includes phenobarbital, gabapentin, levetiracetam, and zonisamide. As a rule, if the seizure frequency allows it, it is preferable to introduce the AED gradually to avoid overt sedation. Phenobarbital remains the first choice in the majority of cats. In Canada, the commercial drug is not available in concentrations smaller than 100mg laboratories. The drug is used in the treatment of focal and generalized seizures. The optimal serum therapeutic concentration is 100-130 ml/L. The dosage is not calculated by weight but by cat. Some cats require 7.5mg q12h and a few 15mg q12h, but most cats necessitate 22.5mg/day, given in two treatments (15mg and 7.5 mg), to reach optimal serum concentration. The sedation is set at the same stage as observed in the dog but the hepatotoxicity, the most concerning side effect in dogs, is not a problem in the cat. Usually, there is no polyuria, polydipsia or polyphagia although possible.

Gabapentin is used in the treatment of focal seizures and seizures with focal onset. Its use is safe and well tolerated in cats. The dosage used is 10 to 40 mg q12h to q8h per cat. In Canada, the commercial drug is not available in concentrations smaller than 100mg laboratories. The drug is used in the treatment of focal and generalized seizures. The optimal serum therapeutic concentration is 100-130 ml/L. The dosage is not calculated by weight but by cat. Some cats require 7.5mg q12h and a few 15mg q12h, but most cats necessitate 22.5mg/day, given in two treatments (15mg and 7.5 mg), to reach optimal serum concentration. The sedation is set at the same stage as observed in the dog but the hepatotoxicity, the most concerning side effect in dogs, is not a problem in the cat. Usually, there is no polyuria, polydipsia or polyphagia although possible.

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capsule necessitating compounding. There is sedation in the early stage of treatment. This author uses gabapentin as second line AED in the cat. Levetiracetam is used in the treatment of focal seizures and seizures with focal onset. It seems to be well tolerated in cats but our experience with the use of this drug in this species is still limited. The dosage advocated is 20 mg/kg orally every 8 hours to reach plasma concentrations within the therapeutic range established for humans. Zonisamide is used for focal and generalized seizures. There is still limited experience with this drug in cats. The dosage advocated is 5 to 10mg/kg once daily per os. Diazepam, a long time first or second AED of choice has been relegated to the treatment of refractory feline epileptic patients in reason of the 17 cases of acute hepatic necrosis and liver failure reported in the 90s. Potassium bromide should not be used in the cat in reason of the life threatening lung disease it may cause.

PROGNOSIS

Contrary to the dog, the severity of seizures at onset of disease does not seem to have a determining effect on outcome. Indeed, it is not rare that a cat, severely epileptic secondary to encephalitis or ischemic encephalopathy, stops to seize once treatment is applied. This is possibly related to the frequent self-limiting causes of seizures in the cat. When the seizures are the result of an acquired cause, the antiepileptic treatment is continued for 6 months seizure-free, then very gradually the patient is weaned off treatment.

CONCLUSION

Feline epilepsy is usually intracranial in origin. The epilepsy in most cases is symptomatic or probably symptomatic. For this reason, a thorough diagnostic work up including MRI of the brain and CSF analysis is advocated in all cats with seizures. It is only once a final diagnosis has been posed that the appropriate treatment can be applied. If the epilepsy is symptomatic, it is crucial to treat the primary cause to optimize seizure control. Among the AEDs available, phenobarbital and gabapentin are the treatments of choice. The prognosis for arrest of seizures in the cat is superior to what is observed in dogs.

REFERENCES: