



ACVIM

Neurology
Fact Sheet

ACVIM Fact Sheet: Encephalitis

Overview

Encephalitis literally means inflammation of the brain. It is not a specific disease entity. Inflammation of the brain (encephalitis) can occur for a number of reasons and from a number of different causes. This inflammation can be caused by infection of the brain (bacterial, viral, fungal and parasites are examples of infectious causes of encephalitis) or can be immune-mediated; which means the body's immune system is malfunctioning and creating abnormal inflammation for reasons we do not fully understand. Immune-mediated encephalitis in dogs is more common than encephalitis caused by infection. The triggers of immune-mediated encephalitis in dogs are poorly understood. There are a few varieties of immune-mediated encephalitis in dogs; "GME" (see prognosis below for more information on GME) and "necrotizing encephalitis" are examples of these. Younger to middle age dogs appear more predisposed to all forms of encephalitis than older dogs. Smaller breed, younger to middle aged dogs appear more predisposed to immune-mediated encephalitis than larger breeds. Encephalitis in cats appears to be less common than it is in dogs; the cause more often infection related.

Recent research has linked gene defects to a certain type of immune-mediated encephalitis (Pug dog encephalitis). Research into the causes and treatments for immune-mediated encephalitis is ongoing. Encephalitis of any kind can be rapidly life threatening and should be diagnosed and treated as early as possible.

Signs & Symptoms

The signs of encephalitis can include seizures, disorientation, behavioral changes, weakness, circling, loss of balance and spinal pain (particularly neck pain). Fever may or may not be present, and is typically absent.

Diagnosis

Routine blood tests (including white blood cell counts) may be abnormal with bacterial encephalitis, but are typically normal for most varieties of encephalitis. The only way to definitively diagnose encephalitis is by biopsy of the inflamed part(s) of the brain. Brain biopsy is difficult in most practice settings, requiring special equipment and skills, and has risks. Brain biopsy is most often done in academic teaching hospitals or veterinary specialty referral hospitals. In most clinical practice settings, encephalitis is diagnosed with spinal tap (done to collect and then analyze spinal fluid) and MRI (magnetic resonance imaging). Spinal fluid analysis can tell us if the brain or its enveloping tissues (meninges) are inflamed or not, but may not tell us the underlying cause of the inflammation. Once encephalitis is diagnosed, additional testing on spinal fluid or blood may be necessary to try to determine if the cause is due to infection; many, but not all infectious causes of encephalitis can be tested for. When infection has been ruled out (to the best of our ability), immune-mediated encephalitis is presumed. There is no specific

direct way to diagnose immune-mediated encephalitis, even though in dogs it is more common than encephalitis caused by infection. A diagnosis of immune-mediated encephalitis is therefore termed a “rule-out diagnosis” or “diagnosis by exclusion.”

Treatment

Treatment for encephalitis depends on the underlying cause. For example, antibiotics are used for bacterial encephalitis while anti-fungal medications may be used for fungal encephalitis. Medications that suppress the immune system are used for immune-mediated encephalitis. There are many options for treating immune-mediated encephalitis. No single medication or even specific combination of medications has had overwhelming success; which is why there are many different medications and protocols used to treat immune-mediated encephalitis. Encephalitis can be rapidly life threatening and should be diagnosed and treated as soon as possible.

Prognosis

Even though any form of encephalitis can be rapidly life threatening, the prognosis is often good if identified early and treated aggressively. Overall, prognosis for encephalitis is variable, and depends on the underlying cause of the inflammation.

“GME” stands for granulomatous meningoencephalomyelitis and is one of the more commonly diagnosed forms of encephalitis. This is a primary inflammatory condition of the brain, meninges or spinal cord and often involves all three. We do not know what causes this inflammation and many scientific studies have found no evidence for an infectious cause; it is therefore presumed to be an immune-mediated form of encephalitis. GME can have the same clinical signs as encephalitis and meningitis. Diagnosis is most commonly made using a combination of MRI, spinal tap and negative blood or spinal fluid tests for infectious causes of encephalitis and meningitis; it is a diagnosis by exclusion. The only definitive way to diagnose GME is by biopsy. Biopsy of the brain or spinal cord is risky, requires advanced equipment or techniques and is most often performed only in specialty hospitals. Many treatments have been used, but typically a combination of medications to suppress the immune system and steroids are used. Long-term therapy is always necessary. Radiation therapy has also been used for focal forms of GME. Prognosis is variable and ranges from very good to poor; it can sometimes be difficult to predict prognosis in an individual dog. Studies are ongoing to try and learn more about this disease. There is some evidence and anecdotal experience to suggest that the more aggressively you treat GME, the more success you will have. Dogs may sometimes be cured with aggressive treatment. Cats do not appear to get GME.

Note:

More recently, one of the unique and more severe forms of necrotizing encephalitis (Pug dog encephalitis) has been linked to a genetic defect. This gene defect has been associated with an increased risk for encephalitis in Pug dogs. A blood test is available to identify this gene defect, but the test does not specifically identify when an individual has the disease. It is therefore not a specific test for Pug dog encephalitis. It can only identify dogs at increased risk for developing this disease and therefore may be best used to

screen Pugs who may be used for breeding. A dog identified as having the gene defect associated with Pug dog encephalitis should not be used for breeding.

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