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GME/MUE

What are the meninges, brain, spinal cord, and spinal fluid?

The meninges are thin outer protective membranes that surround the brain and spinal cord (*central nervous system, CNS*). Among other things, they serve to contain the *spinal fluid* that bathes the CNS. The brain serves as the central control for all neurological function and the spinal cord is made up of nerves that send messages to and from the brain and target organs.

What is GME or MUE?

GME (*granulomatous meningoencephalitis*) or MUE (*meningoencephalitis of unknown etiology*) is an inflammatory condition of the meninges and brain that affects dogs. The abnormal accumulation of white blood cells causes damage to the CNS tissue and a variety of subsequent clinical signs. If left untreated, the disease is fatal.

Although there are a number of breeds predisposed to GME/MUE (including Pugs, Yorkies, and other small breeds), any breed can be affected.

What causes GME/MUE?

The cause of GME/MUE is still not clear. While it is generally considered an immune mediated condition, there is a wide search for infectious organisms such as viruses that could be associated with the condition.

What clinical signs does GME/MUE cause?

Because GME/MUE can affect any part of the brain, there are a wide variety of clinical signs that can be seen. In the early stages of the disease only subtle pain or behavioral changes may be seen. As the disease progresses, more significant signs can develop. Ultimately, the disease is fatal if left untreated.

Common signs include:

- Behavioral changes
- Blindness
- Incoordination
- Pain
- Abnormal eye movements
- Fever
- Seizures
- Abnormal head and neck position



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What other diseases may cause similar signs to GME/MUE?

There are a number of other diseases that can cause similar signs to GME/MUE. These include, but are not limited to: brain tumors, CNS infections, head trauma, brain malformations, genetic conditions, and metabolic conditions such as liver disease.

What laboratory changes does GME/MUE cause?

In most cases, GME/MUE causes no specific lab abnormalities other than those found on the spinal fluid analysis. In some cases, an elevated white cell count in the blood is detected.

What testing is recommended for GME/MUE patients?

In evaluating patients with GME/MUE, there are many things that need to be considered. Urinalysis, CBC and chemistry are performed to evaluate for underlying diseases that may be present. MRI or CT-scan is recommended to evaluate the brain for structural abnormalities. Most critically, the spinal fluid must be sampled to evaluate for the presence of inflammation.

Most patients evaluated for GME/MUE will need the following tests:

- | | | |
|-----------------------------|------------------------------|--------------------|
| ■ Chemistry profile | ■ Complete Blood Count (CBC) | ■ Urinalysis |
| ■ Infectious disease titers | ■ Chest radiographs | ■ MRI or CT-scan |
| | | ■ Spinal fluid tap |

- Depending on the results of the spinal fluid tap, tests for viral, bacterial, and protozoal organisms may be performed. The spinal fluid may also be cultured if bacterial infection is suspected.
- Spinal fluid collection does come with minimal risk that will be discussed at the time of your appointment.

What treatment options are available for GME/MUE patients?

In recent years a number of new promising therapies have been used to treat this disease. These therapies are either immunosuppressive medications or chemotherapy drugs. While none is perfect, the quality of life is generally excellent and survival times for patients with this disease are significantly longer than they were just a few years ago.



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What sort of long-term monitoring is recommended for GME/MUE patients?

General recommendations for follow-up for dogs with GME/MUE are highly variable and dependent on the type and severity of disease and treatment course elected. Periodic recheck for bloodwork and physical examination is always indicated. Some therapies are given in the hospital on an intermittent basis while others are given at home. Finally, in some cases, repeat spinal fluid analysis and advanced imaging are sometimes required.

What is the prognosis with canine GME/MUE?

The prognosis with this disease is always guarded and varies between breeds and from case to case. While many dogs respond to medical therapy and have an excellent quality of life, the majority of dogs will also relapse within months to years of diagnosis. If a first-line therapy becomes ineffective, alternative therapies are available. Of course, we will strive to maintain the maximum quality of life and longevity of your pet.