

Granulomatous Meningoencephalomyelitis (GME)



An unknown cause for inflammation of the brain, spinal cord, and meninges (a protective lining of the central nervous system) is referred to as Granulomatous Meningoencephalomyelitis, or GME. The progressive neurological symptoms of GME include seizures, behavioral changes, compulsive pacing or circling, head tilt, and blindness. White blood cells called mononuclear cells (macrophages and lymphocytes) and plasma cells are responsible for the formation of granulomas, or masses of inflammatory cells, around the blood vessels in CNS tissues, but the reason for their presence is not understood. The cells possess malignant criteria; and while the condition is not considered cancer, it is sometimes referred to as malignant GME and behaves a lot like cancer. There are three manifestations of GME: focal, disseminated, and ophthalmic lesions. A patient may be affected by more than one type.

Focal GME involves one particular area of CNS tissue, or one primary lesion. This manifestation has a slow onset of symptoms (between 3 to 6 months), and the symptoms are limited. Disseminated (widespread) GME has a rapid onset (1-8 weeks) and a greater variety of symptoms. Ophthalmic GME (of the eyes) causes sudden and usually permanent blindness. The disseminated form carries the gravest prognosis due to the wide distribution of granulomatous lesions and symptoms. The type of GME is confirmed by the patient's set of symptoms, CSF (cerebrospinal fluid) analysis, and the distribution of lesions revealed by magnetic resonance imaging (MRI) or computed tomography (CT). Tissue biopsy is the only definitive method to absolutely confirm GME, which may be collected by CT guided brain biopsy or surgery (craniotomy or laminectomy).

A patient with suspected GME will be exhaustively tested for underlying infectious and malignant diseases that may cause a similar set of symptoms. A complete blood panel, urinalysis, and survey radiographs are included in the basic workup. These tests may or may not reveal any abnormalities, but are needed before beginning any treatment medications. Also, a cerebrospinal fluid (CSF) tap, where fluid is collected from the spinal cord canal, is analyzed to confirm the presence of mononuclear cells associated with GME. A CSF tap can rule out other causes of myeloencephalitis such as viral encephalitis (canine distemper), parasitic encephalitis (toxoplasma), fungal encephalitis (*Cryptococcus* spp.), and congenital encephalitis (breed inherited CNS lesions).

The treatment for GME includes the use of high-dose immuno-suppressive medications like prednisone until the neurological symptoms are controlled. The dosage is gradually tapered until the minimum effective blood level can be achieved (to reduce the chance of side effects). Anti-convulsive medications can be used to help control seizures. Adjunct chemotherapy drugs such as cytosine arabinoside (Cytosar-U) and procarbazine (Matulane) may extend the length of GME remission and improve the patient's quality of life. These compounds may cause myelosuppression (decreased bone marrow function); therefore, a complete blood count must be carefully monitored for cytopenia (reduced cell numbers) during therapy. Gastrointestinal side effects, i.e. vomiting and diarrhea, may occur as well.

Radiation therapy may be considered for focal GME, but it is not helpful to treat diffuse lesions. Some dogs with a focal lesion may experience complete remission after radiation therapy. Adverse side effects like cataracts or KCS (reduced tear production) are expected if the radiation field must overlap the eyes. Radiation therapy must be performed by a specialist, and a referral will be necessary.

Overall, the prognosis for Granulomatous Myeloencephalitis is guarded to poor. It should be treated aggressively in order to achieve the best possible outcome.