

What is Multiple Myeloma?

Multiple myeloma (MM) is an abnormal proliferation of malignant plasma cells, which usually arises as a clone of a single cell. Plasma cells are a type of white blood cell and are responsible for producing a large amount of antibodies, defending us against pathogens. These malignant cells produce an over-abundance of a single type of antibody or immunoglobulin referred to as the M component, which can be the whole immunoglobulin or only a part, either the light or heavy chain. In dogs, IgG and IgM immunoglobulin types are found in equal incidence. German shepherds may be overrepresented. The cause of multiple myeloma is unknown but it has been suggested that the following may play a role: genetic predispositions, molecular aberrations, viral infections, chronic immune stimulation and exposure to carcinogen stimulation.

What are the clinical signs?

The clinical signs can vary greatly, and signs are attributable to the high levels of circulating antibodies, specifically the immunoglobulin component (M component) and/or organ or bone infiltration with cancerous cells. Associated pathologic conditions include bone disease, bleeding disorders, hyperviscosity syndrome (sludging of blood), kidney disease, altered immune system (and subsequent susceptibility to infections), and decreased circulating white and red blood cell components secondary to myelophthisis (replacement of bone marrow with abnormal tissue). Some animals can also have high levels of calcium circulating in their blood. This can cause kidney damage, heart damage, nerve conduction abnormalities, and excessive muscle contractions. Susceptibility to infection often causes sickness in affected animals and is due to depressed levels of normal antibodies and decreased circulating white blood cells that may develop secondary to bone marrow suppression.

How is a diagnosis made?

This cancer can be difficult to diagnose. On x-rays (radiographs), your veterinarian may note an area of osteolysis (decreased bony mass) often within the vertebra or ribs. This bony change, however, can be found in any bone. Also, your dog may have a high level of circulating globulins or proteins in their bloodwork. Another typical abnormality seen in patients with this cancer is excessive urine protein, called bence jones proteinuria. A bone marrow biopsy aspirate can then be used to support a diagnosis. Depending on physical examination and preliminary diagnostic tests, your oncologist may recommend further diagnostic tests such as images or biopsies. Traditionally, 3 out of the 4 positive diagnostic tests above are needed to confirm this cancer.

How is Multiple Myeloma treated, and what is the prognosis?

Multiple myeloma is typically treated with an oral, life-long chemotherapeutic drug called Melphalan that is used to address both the neoplastic cells as well as the effects secondary to the neoplastic cells. Most canine multiple myeloma patients treated with melphalan and prednisone will have a reduction in tumor cell burden, bone pain relief and a reduced level of serum immunoglobulins. Approximately 50% of dogs will have a complete response to therapy (no gross evidence of disease) and 40% will have a partial response (generally resulting in improved quality of life and decreased skeletal pain). Patients that do respond generally have a mean response time of approximately one and a half years with many cases doing well on therapy even longer. This being said, it

is rare that treatment will completely eliminate neoplastic cells.

The most clinically significant toxicity associated with melphalan use is myelosuppression (especially thrombocytopenia, or decreased platelets). Most dogs tolerate the melphalan/prednisone combination quite well. Routine rechecks and bloodwork are required to ensure adequate response to therapy and to ensure the patient is safely tolerating the chemotherapy.