

Brain tumors in dogs

Your dog has been diagnosed with a presumptive brain tumor. Many people have family members or friends that have been diagnosed with cancer. While it's always scary to get a diagnosis of cancer in your pet, it is very important to remember that many pets can be treated effectively and still have a good quality of life for a significant amount of time.

Clinical signs

The clinical signs depend on the location within the brain. The table below lists common signs that are seen based on tumor location. Not all of the neurological signs need be present. Often there are non-specific changes that are noticed by owners, such as lethargy, decreased appetite, and weight loss.

Location & clinical signs

Forebrain: Seizures, behavior change, change in personality, weakness on the opposite side of the body, blindness, eliminating in the house, endocrine disease (e.g., diabetes, Cushing's disease)

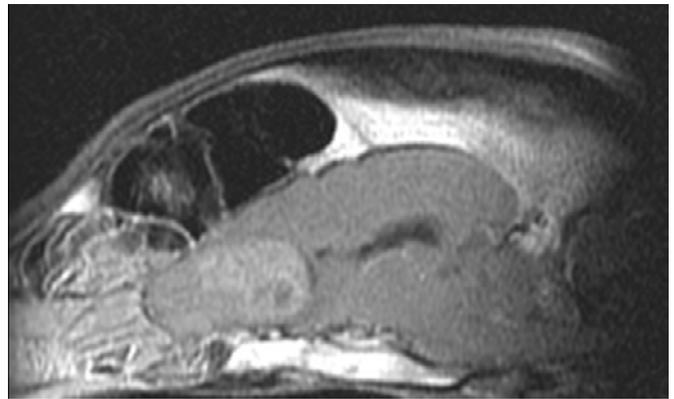
Brainstem: Balance problems (head tilt, falling, rolling), facial weakness, difficulty swallowing, weakness on one side of the body or weakness in all 4 legs, change in level of consciousness

Cerebellum: Spastic or goose-stepping gait, head tremors, incoordination

Diagnosis

In most cases, a presumptive diagnosis is made using a combination of tests, the most important of which is some form of brain imaging. Before imaging, blood tests are performed to rule out metabolic/systemic causes for the clinical signs and to be sure that your pet is safe for general anesthesia, which is required to scan the brain in dogs & cats. Blood tests RARELY provide a diagnosis of cancer. We also commonly perform chest X-rays and abdominal ultrasound to rule out other diseases, such as heart disease, pneumonia, and cancer elsewhere that might preclude imaging.

MRI is the best imaging tool available to visualize the brain. Computed tomography (CT) scan (commonly referred to as a CAT scan) also can be used to visualize the brain in a more cost-effective manner, but the image quality of soft tissues such as the brain is far superior with MRI and gives us much more information. Also, CT scans will occasionally miss smaller abnormalities that MRI can detect. X-rays of the skull RARELY show abnormalities.



MRI obtained from a dog with a sudden onset of seizures showing a large mass (M) in the olfactory bulb/frontal lobe. The dog lived for almost 3 years after surgery and radiation therapy before developing unrelated kidney failure.

A spinal tap may be performed to help further narrow the possible causes for your dog's clinical signs. A small sample of the fluid that surrounds the brain and spinal cord is collected while the patient is under general anesthesia. This procedure is not painful to your pet. Spinal fluid analysis is used to help rule out inflammation & infection in the brain and occasionally will provide a definitive diagnosis of lymphoma, a type of cancer. MRI and spinal fluid analysis usually will allow us to diagnose a brain tumor fairly confidently. However, the only way to make a 100% definitive diagnosis is to biopsy the tumor.

Treatment

Treatment options depend upon the likely type and location of the tumor and include surgery, radiation therapy, chemotherapy, and oral medications.

Surgery

If the tumor is in a relatively superficial location, surgery is the best form of treatment to either completely remove the tumor or to remove as much as possible (debulk). Meningioma is the most common brain tumor in dogs overall, especially dogs with long noses (dolichocephalic breeds). This is a cancer of the meninges, which are protective membranes that surround the brain and spinal cord. Surgical removal of meningiomas, followed by radiation therapy, may provide a long survival time with a good quality of life. If the tumor is not surgically accessible, radiation therapy or oral chemotherapy become the best treatment options. In some cases, radiation therapy is recommended following surgery.

Radiation & chemotherapy

Radiation therapy and chemotherapy are MUCH better tolerated in animals than in people. Radiation works by damaging the DNA in the cells that it hits. When the cancer cells try to divide, they die because the DNA has been damaged to the point that the cell can't divide. Cancers that are dividing quickly will shrink faster than cancers that are dividing slowly. Many brain tumors divide relatively slowly, so it might take 3-4 months to see the full effect of radiation therapy. In the meantime, many patients are given oral medications to help control the clinical signs. Most patients tolerate radiation and the anesthesia quite well as long as there are no significant concurrent diseases, such as heart disease, diabetes, Cushing's Disease, and kidney failure.

Chemotherapy works similarly to radiation in that it damages cancer's ability to divide & grow. Only a few chemotherapy medications can enter the brain due to the presence of a blood-brain barrier that prevents anything toxic from entering the brain. The most commonly used medications are Lomustine, an oral medication given every 4-6 weeks, and cytarabine, an injection given underneath the skin or intravenously every 3-4 weeks.

Many people have negative thoughts about radiation and chemotherapy because of the side effects seen in people. Both radiation therapy and chemotherapy can damage normal cells in the body which can lead to the typical side effects of nausea, vomiting, diarrhea, bone marrow suppression, and hair loss. A major difference in animals is that these side effects, while possible, are much less frequent than in people. This is because physician oncologists give the

highest dose possible to keep people alive for more than five years. Animals have a much shorter lifespan than people, so our goals are slightly different. We can't tell your pet, "You're going to be sick from this treatment, and you have to live with it." As a result, we give slightly lower doses of chemotherapy to dogs and cats to avoid the severe side effects while giving your pet as good a quality of life for as long as possible.

Oral medications

Prednisone is the medication used most commonly. It helps reduce cerebral edema, which is fluid accumulation within the brain tissue surrounding the tumor. Prednisone can lead to a dramatic improvement in your pet's quality of life. Other medications, such as anti-seizure medications, also may be given depending upon the nature of your dog's illness.

Prognosis

As in people, treatment rarely cures cancer. Thus, our goal is to provide the longest survival time possible while maintaining a good quality of life for you and your dog. Historically, many people euthanized their pets as soon as a diagnosis was made or they would not allow surgical biopsy or autopsy to obtain a definitive diagnosis. As a result, we do not have survival data from large-scale studies as they do in human medicine.

The prognosis for many brain tumors in dogs is variable. Surgical removal of meningioma followed by radiation therapy provides an average survival time of about 18-24 months. In general, radiation therapy alone for brain tumors may provide a 1-2 year survival time. The prognosis for other tumor types (e.g., glioma, lymphoma, pituitary tumor) depends upon the treatment method chosen. There is little data on chemotherapy in dogs to provide an accurate prognosis, but anecdotal reports suggest chemotherapy may provide a 6-12 month survival time. Patients that are treated with steroids alone often are euthanized within 3-6 months due to the progression of clinical signs.

While these numbers do not sound like a long time to us, it is important to remember that dogs have a much shorter lifespan than people and 1-2 years is a long time for them. Regardless of what treatment method you choose for your pet, we will do everything we can to improve your dog's quality of life. ■