



The Pet Oncologist

## **Brain Tumours in Dogs. What a headache!**



**Brain tumours are uncommon in dogs but should be suspected in any middle-aged or older dog with acute or progressive brain dysfunction. What is the prognosis, and what are the treatment options?**

**First, let's start with some information about brain tumours in dogs.**

Brain tumours may present a primary tumour or metastasis (i.e. cancer spread). The most common primary brain tumour is a meningioma, followed by glioma. Other less common brain tumours include choroid plexus tumours, ependymomas, lymphoma, gliomatosis cerebri and histiocytic sarcoma. Secondary brain tumours (i.e. metastatic brain tumours) represent approximately half of all brain tumours in dogs, including haemangiosarcoma, pituitary tumours, lymphoma and metastatic carcinomas.

Brain tumours may occur in any age and breed with no reported sex predisposition. However, most primary brain tumours have been reported in Golden retrievers and boxers, dolichocephalic breeds are prone to developing meningiomas, and brachycephalic breeds are more prone to developing gliomas. Most brain tumours occur in older dogs (median age of 9-10 years), but they can occur at any age and breed.

These tumours are space-occupying intracranial lesions that cause clinical signs of brain dysfunction by directly compressing or invading brain tissue, and indirectly through secondary effects (such as induction of peritumoural oedema, inflammation, obstructive hydrocephalus and intracranial haemorrhage). Metastasis from most primary brain tumours to other sites is rare but have been reported.

Seizures are the most common clinical signs, although dogs may present with non-specific signs (such as lethargy and inappetence), or neurologic signs relating to the neuroanatomic location/s of the tumour.

### ***What is the prognosis?***

The prognosis for brain tumours in dogs is poor, with a median (average) survival time of around two months with supportive care alone. However, with treatment, the vast majority of dogs can be significantly helped.

Knowledge on the prognosis is limited. However, tumour type and histologic grade are the most consistent and reliable prognostic factors.

Meningiomas and pituitary tumours tend to have a better response to treatment and longer survival times than gliomas or other intra-axial brain tumours, which are more infiltrative locally.

Histologic grade in people is associated with clinical outcome. Dogs with grade I meningiomas have a more favourable prognosis than grade II or grade II meningiomas. Unfortunately, there is insufficient data in the veterinary literature to evaluate the effect of glioma grade on clinical outcome. However, higher grades are likely to have a worse prognosis.

### ***What are the treatment options?***

#### Surgery and radiation therapy

- The best survival outcomes for brain tumours is surgery, followed by adjuvant conventional finely fractionated radiation therapy.
- If surgery is possible, surgical resection can lead to rapid reduction or elimination of tumour burden. However, it needs to be performed by an experienced surgeon.
- Surgery alone for dogs with meningiomas is associated with a median survival time of around 7-8 months. However, surgery followed by radiation therapy is associated with a median survival time of 1.3-2.5 years.
- Transsphenoidal hypophysectomy (i.e. surgery) is an effective treatment option for some pituitary tumours with a median survival time of two years. However, it is only offered in a few veterinary hospitals worldwide.
- Unfortunately, the benefits of surgery have not been established for dogs with gliomas, choroid plexus tumours, ependymomas. Surgery is seldom attempted due to their intra-axial or intraventricular location, infiltrative nature and challenges in defining surgical margins.
- Surgery is not recommended in dogs with metastatic brain tumours.

#### Surgery and chemotherapy

- When radiation therapy is not available, chemotherapy can be considered in dogs after surgery. In one study, the median survival time in dogs with brain tumours with surgery and lomustine (CCNU) chemotherapy was around 1.4 years.

### Radiation therapy

- For most brain tumours, surgery is not possible. Therefore, radiation therapy is considered the mainstay of treatment.
- Radiation therapy is effective at reducing tumour size, improving neurologic signs, and improving survival outcomes.
- The median survival times for treatment with conventional finely fractionated radiation therapy is around 7-23 months with extra-axial brain tumours (such as meningiomas) having a more favourable prognosis with survival times between 9 and 19 months, compared to median survival times of around 6-9 months in dogs with intra-axial brain tumours (such as gliomas).
- Stereotactic radiation therapy allows precision delivery of high doses of radiation therapy to a defined tumour target and relative sparing of surrounding normal tissue. It is still relatively new in veterinary medicine and is actively investigated for the treatment of many types of brain tumours. At this present time, it appears to be offer comparable tumour control when compared to conventional finely fractionated radiation therapy, but it is not readily available, costly, and not all dogs with brain tumours are eligible to receive treatment.

### Chemotherapy

- Chemotherapeutics that can be considered include CCNU, carmustine, procarbazine, hydroxyurea, temozolomide and melphalan, which can penetrate the blood-brain barrier.
- The median survival time with CCNU alone is around 5-6 months. Many dogs show improvement in neurologic signs and improved quality of life with chemotherapy.
- Chemotherapy is the treatment of choice for dogs with metastatic brain tumours.

### Supportive care

- Anticonvulsants, prednisolone and omeprazole are some supportive medications that can be used in dogs with brain tumours. Prednisolone can reduce peritumoral vasogenic oedema and make most dogs feel clinically better within 24-48 hours. Omeprazole can reduce cerebrospinal fluid production in dogs. Therefore, it may assist in reducing peritumoral vasogenic oedema associated with brain tumours.

**Vets, I hope this information helps you understand a bit more about the prognosis and treatment options for dogs with brain tumours. If you have a question about canine brain tumours or have a case that you would like evaluated, please do not hesitate to get in touch. Email: [info@thepetoncologist.com](mailto:info@thepetoncologist.com).**