Radiotherapy for Brain Tumours
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Radiotherapy is typically the treatment of choice for brain tumours. Due to the size/extent and location of most of these tumours, surgery is not generally feasible for the majority of patients. Chemotherapy is also typically a poor option, due to seemingly inherent resistance and poor penetration into the central nervous system of many commonly used drugs, as it is protected by a special barrier (the so-called Blood-Brain Barrier or BBB) which stops the drugs penetrating to the site of the tumour. Radiotherapy is therefore typically the gold standard of care for brain tumours and significantly improves survival times compared to best supportive care alone (e.g. steroids such as prednisolone and anti-seizure medications such as phenobarbital, gabapentin, potassium bromide and levetiracetam).
How long will radiotherapy give my dog/cat?
Giving an accurate prognosis (knowing how well radiotherapy will work, and for how long) is difficult for several reasons – we typically do not have a tissue diagnosis (biopsy) in these cases, and there are many different types of brain tumours and varying grades (how rapidly growing the tumours are) within each subtype – which probably explains why some cases do extremely well with long survival times, whilst some dogs unfortunately do very poorly and have a rapid demise. In addition, even within the same tumour types and grades, clinical signs can vary markedly from patient to patient, depending on the tumour size and its location within the brain. Therefore, it is fundamentally impossible to guide owners as to the likely survival time in an individual patient with or without treatment using radiotherapy. All we really can say is that radiotherapy will very likely improve the outcome compared to not having radiotherapy.

Some older scientific studies reported average survival times with radiotherapy to be in the region of 6 to 12 months, but more recent studies have documented survival times of 18 to 24 months. This improvement may reflect more accurate CT-scan planning, and a head mould will generally be created at the same time, to allow accurate patient placement, beam alignment and immobilisation of the head during therapy. Radiotherapy is planned very carefully from the CT (and potential MRI) scans and utilises computer software to target the dose to the tumour, whilst avoiding surrounding normal brain and other important structures, such as the eyes, ears and the inside of the mouth. Despite taking all this care and using cutting-edge technology, some dosage of radiation to these surrounding areas is inevitable, however, as a margin of therapy has to be added around the tumour to allow for microscopic spread of tumour away from the main mass, and also because of subtle patient movement during treatment, even though an anaesthetic has been given. The main reasons why 12 small fractions of radiation are given for brain tumours (as opposed to a smaller number of treatments, each at a higher dose) is to limit both any acute side-effects (e.g. brain swelling) and also to minimise risks of late side-effects, such as long-term brain damage. Using this higher number of fractions of radiotherapy, we can also safely administer greater total doses of radiation, which improves the probability of controlling the tumour for longer. Slightly different protocols may be given by certain centres, either as their main protocol or as modifications for individual patients.

What are the possible side-effects of radiotherapy?
The great majority of dogs and cats receiving radiotherapy for brain tumours have an excellent quality of life and continue with their normal daily routine.

Acute side-effects (side-effects which happen whilst the patient is undergoing a course of treatment) can happen quickly with brain tumours, though the small fraction size of radiation used and the steroids that are given concurrently should make these side-effects unlikely. In the event that they do occur, they are most likely to happen in the 3rd and 4th week of therapy. They can manifest as non-specific signs, possibly due to ‘headache’ or some inflammation/swelling, and they may require treatment with a higher dose of steroids and/or analgesia (pain relief). Given the location of the tumour, more serious side-effects include seizing (fits) which occasionally (though very rarely) can be severe – this is unlikely, however, unless the patient was already having seizures due to the tumour before the treatment commenced. Some dogs will be given pre-emptive anti-seizure medications if the risk of seizures is thought to be high. An extremely rare, but significant, adverse effect of treatment in the acute setting is a rise in intra-cranial pressure (pressure inside the skull) which can be very serious.

Late side-effects are fortunately rare and the risk is reduced by the small dose of radiation administered with each fraction. Where they are encountered, these side-effects tend to occur months or even later after radiation and are generally seen as worsening of neurological signs. Typically these problems are irreversible, but fortunately they are rare.

Despite the possibility of side-effects, the vast majority of dogs and cats get through their course of radiotherapy with few problems, and owners are usually very surprised at how little the treatment has impacted on their pet’s quality of life and normal daily routine, both
during and after treatment. Most dogs need to remain on a low dose of steroids for several weeks to months after radiation, and they will also usually continue on any anti-seizure medication. Unfortunately, some dogs who have lost vision before treatment due to their brain tumour may not regain their sight – though a return of some vision may be more likely (but certainly not guaranteed) in the case of some pituitary gland brain tumours.

Will my dog or cat be a suitable candidate for radiotherapy?

Because several general anaesthetics are required during investigation, planning and treatment, patients undergoing radiotherapy should be free of significant heart, kidney or liver disease and should ideally not have any concurrent problems that could be problematic.

There are a number of centres currently offering radiation therapy for brain tumours.

These are:

- Southfields Veterinary Specialists, Essex
- University of Liverpool Veterinary School
- University of Cambridge Veterinary School
- University of Glasgow Veterinary School
- University of Edinburgh Veterinary School
- Animal Health Trust, Newmarket

Radiotherapy is not an inexpensive treatment – further information regarding costs and any additional implications for your pet can be discussed with your pet’s oncologist who will be happy to help.

Why should I bring my pet to Willows?

Willows is unique in the UK in having recognised, accredited cancer specialists working in both the medical and surgical aspects of tumour diagnosis and management.

We aim to provide the best possible care and treatment for your pet in our state-of-the-art hospital. Our oncologists work closely with the imaging Specialists who run Willows sophisticated imaging facilities, as well as with expert anaesthesia and analgesia Specialists and 24-hour veterinary and nursing staff, all of whom help to give our patients the very best treatment and care.

If you have any queries or concerns, please do not hesitate to contact us.