

# RADIO THERAPY FOR PITUITARY TUMOURS IN DOGS



## What are pituitary tumours? Are they different from other brain tumours?

Pituitary tumours arise from a small gland located at the base of the brain (the pituitary gland), which controls many hormonal functions in the body.

These tumours behave somewhat differently to other brain tumours and are therefore discussed separately.

Pituitary tumours can be

- + **Non-functional (non-hormone producing)** - causing problems due to pressure on the brain
- + **Functional (hormone producing)** - most commonly causing **Cushing's Disease (pituitary-dependent hypercortisolism)**

## What symptoms do pituitary tumours cause?

Dogs with pituitary tumours may show:

### Hormonal (endocrine) signs

- + Increased thirst and urination
- + Panting
- + Hair loss or skin changes
- + "Pot-bellied" appearance

These signs are typically related to Cushing's disease (hyperadrenocorticism).

### Neurological signs

- + Behaviour changes or mental dullness
- + Circling or disorientation
- + Blindness
- + Seizures (less common than other brain tumors)
- + Balance issues
- + Loss of appetite, vague changes
- + No symptoms (if they are diagnosed due to a dog having Cushing's, or picked up during testing for another condition).

Around half of dogs may develop neurological signs, especially as the tumour grows and presses on nearby brain structures.

## Is surgery useful for pituitary tumours?

Surgical removal (hypophysectomy) is possible but:

- + It is technically challenging
- + Requires specialist expertise and facilities
- + Has a higher risk of complications for larger tumors
- + Creates multiple other conditions that require lifelong medication (lifelong steroids, thyroid supplementation)

For these reasons, surgery is **not commonly performed** in most veterinary centres.

Radiotherapy is therefore the **most widely used treatment**, particularly for larger tumours causing neurological signs.

## What is the aim of radiotherapy?

Radiotherapy (RT) uses high-energy X-rays to treat the tumour.

The goals of treatment are to:

- + Reduce tumour size
- + Improve neurological signs
- + Slow or stop tumour growth
- + Improve quality of life

Radiotherapy has been shown to:

- + Improve neurological signs in most dogs
- + Reduce tumour size in a significant proportion of cases
- + Extend survival compared with no treatment or medical therapy alone

However, it is important to note that **radiotherapy is rarely curative**. However, average survivals are encouraging and particularly for dogs with small tumour with minimal neurologic signs, the outcome can be excellent.

## How is radiotherapy given?

Radiotherapy is delivered using a **linear accelerator**, with carefully planned treatment to target the tumour while minimising damage to surrounding brain tissue.

Each treatment is given under a **short general anaesthetic**.

A planning CT (and sometimes MRI) is required beforehand to create a personalised treatment plan.

## What radiotherapy protocols are available?

### 1 - Fractionated Radiotherapy (FRT):

- + Typically **10–20 treatments** over 2–4 weeks (our most commonly recommended protocol is 16 daily treatments)
- + Small daily doses to minimise long-term side effects to the brain and nerves
- + Aims for the **best long-term tumour control**
- + Suitable for pretty much all pituitary tumours

### 2 - Stereotactic Radiotherapy (SRT):

- + Typically **5 treatments** over a few days
- + Highly focused, shorter course
- + Slightly higher risk of certain delayed side effects
- + Some patients may not be candidate depending on features of their tumour
- + Significantly more expensive than FRT

## Which is better?

Most earlier studies showed that SRT was inferior to FRT for dogs with pituitary tumours – though some study bias was possible. However, a recent small study suggested that a 5-session SRT protocol was as good as FRT. Until more data is published, at our hospital we recommend FRT as the most robust option – but will consider SRT where this may be beneficial for the pets and/or owners (e.g. medical conditions concerning for repeated anaesthesia, behavioural concerns, cases deemed high risk for repeated anaesthesia).

Both approaches can be effective, and the choice depends on the individual patient and tumour.

## What outcomes can we expect?

Outcomes vary depending on tumour size, clinical signs, and treatment type.

Studies suggest:

- + Median survival times of approximately **1.5–2 years** with definitive radiotherapy. Some studies report even better outcomes
- + Many dogs experience **improvement in neurological signs**
- + Tumour shrinkage or stabilisation is common

Higher radiation doses are associated with improved survival.

## Will radiotherapy treat Cushing's disease as well?

Radiotherapy may:

- + Reduce hormone production in some dogs
- + Improve clinical signs of Cushing's disease

However:

- + The effect is **variable and not guaranteed**
- + Many dogs will still require **ongoing medical management** (e.g. trilostane)

## What are the side effects of radiotherapy?

Radiotherapy is generally **well tolerated**. Most dogs with pituitary tumours do not get significant effects directly related to radiotherapy.

**Short-term side effects (uncommon and usually mild):**

- + Temporary tiredness
- + Mild skin, eye, or ear irritation

**Long-term risks (rare):**

- + Delayed brain effects
- + Underactive thyroid requiring medication

Overall, modern techniques significantly reduce the risk of serious complications.

## Will my dog need ongoing medication?

Many dogs will continue to require:

- + Medication for Cushing's disease (if present)
- + Occasionally steroids (short-term) for a few weeks after treatment
- + Other supportive medications depending on symptoms

## Summary

- + Pituitary tumours are distinct from other brain tumours
- + They often cause both **hormonal and neurological signs**
- + **Radiotherapy is the most common treatment**
- + Treatment is usually well tolerated and can **significantly improve quality of life**
- + While not curative, radiotherapy can provide **meaningful long-term control**

