

## Hyperadrenocorticism (Cushing's Disease)

### What is Cushing's disease?

**Hyperadrenocorticism (HAC)**, or **Cushing's disease**, in dogs is caused by a chronic excess of glucocorticoid activity. Glucocorticoids are the natural steroids in the body and cortisol is an important hormone which helps to regulate the body's metabolism.

Cushing's disease is one of the most commonly diagnosed endocrinopathies in dogs and can affect a dog's health, vitality and appearance. It is generally seen in middle aged to older dogs.

### What causes canine Cushing's syndrome?

Glucocorticoids are released from the adrenal glands, small glands near the kidneys. The release of glucocorticoids is controlled by ACTH hormone, which is secreted by the pituitary gland in the brain.

Cushing's disease can either be adrenal-dependent or pituitary-dependent.

In dogs, 80-85% of cases of naturally occurring Cushing's disease are caused by over-secretion of ACTH by a lesion in the pituitary gland, typically due to hyperplasia (enlargement of) or neoplasia (cancer of) the pituitary. This leads to bilateral enlargement of the adrenals and increased glucocorticoids in the blood. Excessive glucocorticoid activity due to cortisol is known as hypercortisolism, hence this form of Cushing's syndrome is known as pituitary-dependent hypercortisolism (PDH).

In the remaining 15-20% of cases, excessive cortisol is due to unregulated cortisol secretion from the adrenal cortex, generally associated with adrenal neoplasia (tumour of the adrenal gland). This is more commonly known as adrenal-dependent hypercortisolism (ADH).

Cushing's disease can also be iatrogenic, caused by chronic administration of systemic or topical steroids, such as prednisolone tablets or ear preparations containing steroids.

### What are the symptoms of Cushing's disease

If you think your dog might have Cushing's disease, or you've had a diagnosis from your vet, you might notice the following symptoms:

- Increased thirst (**p**olydipsia)
- Increased urination (**p**olyuria), recurrent urinary tract infections
- Increased appetite (**p**olyphagia)

- **P**ot bellied appearance, due to abdominal muscle weakness, enlarged liver, large bladder
- **P**oor exercise tolerance
- **P**anting
- Hair and coat changes, alopecia, paper thin skin, increased **p**igmentation, recurrent **p**ioderma and a rat's tail appearance.

Look out for the **P signs!**



**How is Cushing's disease diagnosed?**

You may pick up on the symptoms yourself, like a deterioration in your dog's coat, ravenous appetite or excessive thirst. When you discuss this with your vet, they may suspect hyperadrenocorticism and suggest generalised blood and urine tests. With these tests, an increase in liver enzymes, cholesterol, fats, glucose and neutrophils, plus low lymphocytes and very dilute urine can raise the suspicion

further. Your vet may also request a urine cortisol:creatinine ratio to be checked at the lab on the urine sample, although this is a less reliable test for Cushing's.

Specific tests will then be performed to confirm or disprove the diagnosis of Cushing's disease.

Cortisol levels in the blood fluctuate throughout the day in healthy dogs and Cushingoid dogs, so a one-off measurement of cortisol is not enough to provide a diagnosis.

The two most commonly used tests are the **low-dose dexamethasone suppression test** (LDDST) and the **ACTH-stimulation test**.

In the LDDST, your dog will be blood sampled for their resting cortisol level then they are injected with a steroid called dexamethasone. The tests will be repeated at 4 and 8 hours post injection to assess your dog's response to the steroid injection. In a dog with Cushing's, the cortisol level will remain elevated as the dexamethasone is unable to suppress the increased amount of cortisol produced by the dog itself.

When using an ACTH stimulation test, a blood sample is taken for resting cortisol, a synthetic version of ACTH is then injected in to your dog's vein and a further blood sample is drawn an hour later. This test shows if your dog is overproducing cortisol by assessing the response of the adrenal glands to stimulation by the hormone ACTH. As ACTH naturally stimulates the production of cortisol, a dog without Cushing's will produce a mild response and an increase in cortisol (e.g. 300-400nmol/l) but in a Cushingoid dog, this response will be much greater, with values of 550-600nmol/l seen.

### **Pituitary vs. Adrenal dependent HAC**

Once initial tests have confirmed a diagnosis of Cushing's disease, your vet may then discuss further tests to find out whether your dog has **pituitary** or **adrenal** disease. This may involve further blood tests, abdominal ultrasound, CT or MRI scans of the brain.

Not all cases of Cushing's will have their disease categorised as pituitary or adrenal, partly due to being cost prohibitive for some owners and partly because it may not change the treatment course. However, these should be considered as they may offer alternative treatment options (e.g. surgical removal of a cancerous adrenal gland) and provide a better idea of prognosis for your dog.

### **Treatments options for Hyperadrenocorticism**

The prognosis for dog's with Cushing's disease is good with appropriate treatment, of which medical and surgical options are available;

- **Medical management** - medication is an excellent way of controlling the clinical signs associated with Cushing's disease, allowing your dog's health to be restored. The licensed medication trilostane (Vetoryl) can be used to treat both pituitary and adrenal-dependent

hyperadrenocorticism. Trilostane reduces the production of cortisol by the adrenal glands. The medication is generally well tolerated. Sometimes vomiting and diarrhoea can be side effects at the start of treatment, but this tends to resolve if the medication is withdrawn then reintroduced slowly.

- **Surgery** - for dogs diagnosed with pituitary-dependent hyperadrenocorticism, the pituitary gland can be removed through the soft palate in a procedure called a **trans-sphenoidal hypophysectomy**. This would need to be performed at a specialist centre.
- For patients with adrenal-dependent disease, the surgical options is unilateral **adrenalectomy** to remove the primary adrenal mass.
- **Radiation therapy** - radiation therapy of the pituitary gland is only available in a small number of veterinary facilities in Europe. It's poor availability, cost and need for multiple general anaesthetics means it is not widely utilised currently.



*Before and after photos of dogs with Cushing's disease that have been successfully treated with trilostane (Vetoryl).*

### **Monitoring the treatment of Cushing's disease**

Whilst your dog's symptoms are important for monitoring response to treatment, blood tests are also required to confirm the correct Vetoryl dose. Routine blood tests should be performed at **4 weeks, 12**

**weeks** and every **3 months** after starting treatment.

Monitoring is important and regular checks performed by your veterinary surgeon will ensure your dog continues to get the best possible care.

Ensure you continue giving your dog the prescribed dose of Vetoryl even after you notice improvements in your dogs symptoms. Vetoryl will curb the excesses associated with the overproduction of cortisol and manage the clinical signs but **it will not cure your dog**.

### **Top tips for giving Vetoryl to your dog**

- Give Vetoryl capsules with food, ideally in the morning around the same time each day
- Do not spilt the capsules
- Monitor your dog's symptoms of Cushing's, keeping a diary can be useful
- Contact your veterinary surgeon immediately if your dog stops eating, drinking or urinating or becomes unwell while on Vetoryl
- Wash your hands after using Vetoryl
- Don't handle Vetoryl capsules if you are pregnant, or planning to become pregnant
- Don't give a double dose if you have forgotten a dose before
- Ensure you continue giving your dog the prescribed dose of Vetoryl.

### **What happens if Cushing's is left untreated?**

If left untreated, Cushing's disease has a major impact on and reduces your dog's quality of life. As Cushing's progresses over time, the symptoms e.g. excessive panting, tiredness, increases in thirst, and urinating inside, are likely to worsen without treatment.

There are also a number of potentially life-threatening conditions which can occur as a result of Cushing's. These include:

- Diabetes Mellitus
- High blood pressure
- Pancreatitis (inflammation of the pancreas)
- Infections of the kidneys and bladder
- Pulmonary thromboembolism (blood clots in the lung)

Cushing's disease is not a life sentence for dogs but can be life-limiting due to a reduction in their quality of life. If you think your dog may be displaying any of the symptoms, please contact us and we will book them in for a health check with one of the vets.

**To book in for your dog in for a health check or testing, please call us on 01423 228080 or visit [www.clarohillvets.co.uk](http://www.clarohillvets.co.uk).**