

Hyperadrenocorticism (Cushing's Disease) in Dogs

About Cushing's Disease

Cushing's disease is named after the person who discovered it and is the correct name in human medicine, but the veterinary profession usually refers to the more descriptive term of 'hyperadrenocorticism'. This is a condition caused by a hormone imbalance in the body, which is itself caused either by a problem with the pituitary (found in the brain) – the most common cause – or with the adrenal glands (located close to the kidneys).

The pituitary gland produces a hormone that controls the release of another hormone, cortisol, from the adrenal gland. This sequence of events is under tight regulation under normal conditions, with cortisol production increasing in response to stress and reducing at other times.

Most dogs (around 80-85%) with hyperadrenocorticism (HAC) have developed the condition because of a cancer of the pituitary gland. These growths may be benign or malignant, but the effect is the same: to remove the negative feedback on cortisol production. This means that the adrenal glands are constantly stimulated to release more cortisol (the 'stress hormone') into the body despite already elevated circulating levels.

The remaining dogs with HAC that do not have a pituitary lesion have developed the condition because of a cancer of the adrenal gland or glands. In the majority of cases, the lesion is only in one of the two glands, but the increase in cortisol production is marked. In these cases, the negative feedback loop is still working, but the cancerous part of the gland that is over-producing cortisol does not respond to it. Therefore, the opposite adrenal gland becomes extremely small in an attempt to reduce blood levels of cortisol.

Cortisol: the stress hormone

Cortisol is known as the stress hormone because it is released in times of physiological or psychological stress. However, it is routinely released at other times because its effects are to regulate a wide variety of processes in the body. A few important roles of cortisol are listed below, but there are many, many more!

1. Regulates sodium reabsorption by the kidneys via regulation of potassium elimination
2. Regulates hydration by affecting the reabsorption of water in the kidneys – this is directly linked to sodium reabsorption
3. Causes the release of sugar into the blood stream to allow the 'fight or flight' response, and limits sugar up-take and storage by the liver
4. Increases the permeability (leakiness) of blood vessels to allow larger white blood cells that fight infections through to areas that are under attack
5. Increases the laxity of connective tissues
6. Helps to regulate calcium balances in the body, essential for nerve and muscle function

Clinical signs (symptoms)

There is a wide range of clinical signs that can be seen in patients affected by HAC – the wide-reaching effects of cortisol are amplified and give the signs that we see. Patients are frequently presented with signs of increased thirst, appetite and urination, and may also suffer with vomiting or diarrhoea. A small percentage (10%) of patients with Cushing's disease will also develop diabetes mellitus because of the continuously increased blood sugar levels they experience. Many patients suffer with recurrent urinary tract infections because of the high sugar levels. Affected individuals may have a change of

body outline, often adopting a 'pot-bellied' appearance because of the increase in ligament laxity. Dogs with HAC often have hair loss over their flanks in a symmetrical pattern and may develop hard lumps in the skin as a result of calcium deposition. The skin may appear more transparent than it was previously, or in some cases may be more pigmented (have a darker colour). Wound healing time is increased so odd cuts and scratches may take longer than usual to seal over.

Diagnosis

There are many hoops to jump through before a diagnosis of hyperadrenocorticism (Cushing's disease) can be reached. Initial screening blood and urine tests are needed to rule in or out other disease processes, and some of these may need to be rectified then the tests repeated if HAC is still suspected.

Once any other conditions have been considered, if Cushing's disease is still suspected, further specialized blood tests may be required. An ACTH stimulation test may be performed to analyse the body's response to excessive cortisol. This frequently gives an indication of HAC but in some cases may not provide a diagnosis, so an additional dexamethasone suppression test may be required. This may also help to differentiate between central (pituitary) and adrenal HAC. In order to check for adrenal causes, an ultrasound scan of the adrenal glands may be required.

In some cases, specific tests such as fructosamine readings may be suggested to check for the presence of diabetes mellitus.

Treatment

Treatment of Cushing's disease may to some extent depend upon the cause. The preferred medication is called trilostane and comes in a tablet form to be given every day. The dose must be titrated to the correct level for the individual so repeat blood tests will be required. Dogs with adrenal tumours may be suitable candidates for surgery to remove the affected gland. This is a complicated surgery with many hazards both during and after the operation, so referral to a specialist centre is usually required and the patient is likely to remain in hospital for some time. Medications to stimulate cortisol release or mimic cortisol may be required in the post-operative period. Patients with pituitary lesions are not eligible for surgery, so medication is the only option for these dogs.

How will my dog's condition affect me?

Patients with HAC must be provided with free access to water at all times, including overnight. They will also need more frequent trips to urinate, both during the day and night. You may therefore need to arrange additional care for your pet if nobody is around to let them out, or rearrange work times around them. Patients with HAC are always hungry, so may beg for or steal food, so provisions should be made to lock everything safely away!

If your pet has concurrent diabetes, you may also need to inject your pet – please see our diabetes mellitus information sheet for more information on this condition and its treatment.

Many pets with HAC suffer with repeated urinary infections or infections of minor cuts that take longer to heal, so your dog may need courses of antibiotics from time to time.

Throughout the stabilisation period, repeat blood tests will be required to check the level of cortisol and its suppression. Once your pet's ideal trilostane dose has been reached, the frequency of blood tests may be reduced but will continue throughout the lifetime of the patient. Additional finance



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should therefore be allocated for repeated veterinary visits and diagnostics. Hyperadrenocorticism is not a cheap disease to diagnose or to treat, so owners may face difficult decisions in some cases.

The lifespan of dogs with HAC will be reduced compared with that of healthy dogs, but well managed cases may live a full and happy, healthy life for several years, with the average life expectancy of treated pets falling between two and three years after diagnosis depending on the cause of HAC. This may be lower in dogs with concurrent diseases and higher in other cases.