



Always consult with a veterinarian that you feel comfortable with before diagnosing or treating any disease on your own. This information is for reference only.

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## Hyperadrenocorticism

### Issue Description

*Cushing's syndrome is a condition in which there is an excess of cortisol (cortisone). Cushing can be caused by drugs (e.g. prednisone, depo-medrol, dexamethasone, betamethasone) often prescribed for the treatment of many diseases; this syndrome is known as iatrogenic Cushing's syndrome. It can also be caused by an excess of the body's own cortisol, caused by a pituitary tumor or adrenal tumor.*

### Other Names

*Cushing's Syndrome, Hypercorticism*

### Causes

- Iatrogenic Cushing's syndrome is caused by administration of drugs that suppress the body's own cortisol production. Clinical signs and complications are similar to the naturally occurring disease. The dog can become dependent upon the drugs with chronic use, and abrupt withdrawal can lead to signs related to lack of cortisol, such as lethargy, depression, vomiting, and diarrhea. For these reasons, chronic steroid use is not recommended except in cases of life-threatening immune-mediated disease or chemotherapy protocols.
- Pituitary dependent Cushing's disease is caused by a functional pituitary tumor that stimulates the adrenal glands to produce excess cortisol. The tumor is usually microscopic and benign. Sometimes the tumor can be large enough to cause pressure on the nerves to the eyes and the part of the brain called the hypothalamus, causing behavior changes, lack of appetite, and blindness, in addition to the other signs of Cushing's syndrome. Pituitary-dependent Cushing's disease makes up about 85% of spontaneous Cushing's disease cases.
- Adrenal tumors can be benign, known as adenomas, or malignant, known as carcinomas. They produce cortisol independent of the normal regulatory mechanisms of the body. This is the cause of approx. 15% of occurrences of Cushing's.

### Symptoms

Symptoms of Cushing's disease can be vague and varied and tend to appear gradually and progressively. It is thus easy to mistake Cushing's disease for normal aging. Additionally, many of the clinical symptoms are not unique to Cushing's and could reflect a number of other health concerns.

The most common symptoms include:

- increased/excessive water consumption (polydipsia)
- increased/excessive urination (polyuria)
- urinary accidents in previously housetrained dogs
- increased/excessive appetite (polyphagia)
- appearance of food stealing/guarding, begging, trash dumping, etc.
- sagging, bloated, pot-bellied appearance
- weight gain or its appearance, due to fat redistribution
- loss of muscle mass, giving the appearance of weight loss
- bony, skull-like appearance of head
- exercise intolerance, lethargy, general or hind-leg weakness
- new reluctance to jump on furniture or people
- excess panting, seeking cool surfaces to rest on
- symmetrically thinning hair or baldness (alopecia) on torso
- other coat changes like dullness, dryness

- slow regrowth of hair after clipping
- thin, wrinkled, fragile, and/or darkly pigmented skin
- easily damaged/bruised skin that heals slowly
- hard, calcified lumps in the skin (calcinosis cutis)
- susceptibility to infections (especially skin and urinary)
- diabetes, pancreatitis, seizures

It is generally either the increased water intake and urination or the coat changes which prompt an owner to have their dog evaluated by the veterinarian, as these dogs don't appear suddenly and dramatically ill. It is estimated that 80-85% of Cushingoid dogs have increased water consumption, drinking from 2-10 times normal amounts (normal is considered 1 ounce of water drunk per pound of body weight per day). 85-100% of Cushingoid dogs have skin and coat changes. 80-90% of Cushingoid dogs have an increased appetite, and 90%-95% have a pot-bellied appearance. Considered a disease of middle and old age, dogs typically display symptoms at some point after 6 or 7 years of age. It is estimated that most dogs display some symptom(s) of the disease for one to six years before Cushing's is actually suspected and diagnosed. Certainly it is harder to ignore a dog that urinates throughout the house or a dog who is balding than it is to overlook an older dog who is gradually slowing down on walks.

Other indirect symptoms to consider are the disappearance of previous inflammatory conditions. Dogs with chronic allergies or arthritis may appear considerably better when they develop Cushing's, due to the heavy doses of cortisone they are giving themselves.

## Diagnosis

Cushing's disease can present with a variety of symptoms and may also be involved with several different disease processes. Therefore, it is recommended that any dog suspected of having Cushing's disease should have a complete blood count (CBC), blood chemistry panel, and urinalysis performed as a routine part of the evaluation. Common abnormalities in these tests include increases in alkaline phosphatase, and ALT (liver enzymes), increased cholesterol, decreased BUN (a kidney function test), and dilute urine (low specific gravity).

There are several different tests that can be performed to get a definitive diagnosis of Cushing's disease. Many times the veterinarian may perform more than one test to help confirm the diagnosis or to determine which form of the disease is present. A diagnosis of Cushing's disease, however, should never be made on the basis of laboratory tests alone. The dog needs to be showing symptoms of the disease, and have a medical history consistent with the diagnosis.

The three most common "screening" tests are the urine cortisol:creatinine ratio, the low dose dexamethasone suppression test, and ultrasound.

## Treatment

Treatment depends on the type of Cushing's disease, as well as on the overall health of the canine patient. As many dogs with Cushing's are elderly and may have concurrent health problems, treatment can be complicated. The comfort of the patient should be the ultimate goal. In a dog with severe arthritis, for example, it may be more humane to allow him to remain Cushingoid than to treat the disorder. In general, surgery may be indicated for adrenal tumors. Chemotherapy in the form of Lysodren or Ketoconazole may be used to treat pituitary-dependent or adrenal-based Cushing's. And Anipryl may be tried to combat pituitary-dependent Cushing's. Treatment is best viewed as a means to improve quality of life, rather than increase lifespan.

If Cushing's disease is caused by an adrenal tumor, the logical approach is to surgically remove the tumor and the affected adrenal gland. These tumors tend not to recur on the remaining adrenal gland. In theory, this can cure adrenal-based Cushing's disease, and prognosis is very good for dogs with benign adrenal tumors. Dogs may be treated with ketoconazole prior to surgery to try to minimize the symptoms of Cushing's disease, as one significant symptom of Cushing's is delayed wound healing. There are high risks associated with adrenalectomies, and given that patients are often elderly dogs, this may deter an owner from pursuing this treatment route. 50% of adrenal tumors are malignant and may have already metastasized to liver or lungs by the time they are discovered. Most owners opt for non-surgical treatment.

Pituitary tumors are not removed surgically in veterinary medicine. These tumors tend to be very small and slow-growing and cause little or no damage on their own, aside from overstimulating the adrenal glands. With these canine patients, the symptoms themselves are treated and not the root cause.

Pituitary macroadenomas may be treated with radiation in an attempt to shrink them and thus relieve the neurological symptoms caused by their presence and the pressure they place on brain tissue. Radiation involves thousands of dollars and repeated anesthesia, either of which may be difficult to justify with an elderly patient. Once the neurological symptoms abate, the dog would then be treated for hyperadrenocorticism itself.

## **Prognosis**

Dogs usually respond very well to therapy and are able to lead normal lives. Relapses are quite common with pituitary-dependent Cushing's syndrome, and occur in about half of dogs with Cushings. This generally requires a change in the maintenance dose or re-induction therapy. Good owner observation and communication with the veterinarian are the most important factors that influence the success of treatment. Surgery will cure many benign adrenal tumors and small carcinomas. If there are no post-operative complications, there can be prolonged survival even with invasive tumors or with metastatic disease.

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