Cushing's Disease

By College of Veterinary Medicine, Washington State University

This information is not meant to be a substitute for veterinary care. Always follow the instructions provided by your veterinarian.

Cushing's disease (hyperadrenocorticism) is the overproduction of the hormone cortisol by the adrenal glands that are located in the belly near the kidneys. Cushing's disease occurs commonly in dogs, but is rare in cats. Most dogs with Cushing's disease are about 6 years old or older but sometimes Cushing's disease occurs in younger dogs. Cortisol affects the function of many organs in the body, so the signs of Cushing's disease may be varied. Some of the more common signs of Cushing's disease include hair loss, pot-bellied appearance, increased appetite, and increased drinking and urination called polydipsia and polyuria (PU/PD). Hair loss caused by Cushing's disease occurs primarily on the body, sparing the head and legs. The skin is not usually itchy as it is with other skin diseases. If you pick up a fold of skin on a dog with Cushing's disease, you may notice that the skin is thinner than normal. The pet may have fragile blood vessels and may bruise easily.

Less common signs of Cushing's disease are weakness, panting, and an abnormal way of walking (stiff or standing or walking with the paws knuckled over). Some dogs with Cushing's disease develop a blood clot to the lungs and show a rapid onset of difficulty breathing.

Dogs that are given prednisone or similar drugs can develop signs that look like Cushing's disease (called iatrogenic Cushing's).

There are two types of Cushing's disease that are treated differently. The most common form of Cushing's disease is caused by the overproduction of a hormone by the pituitary gland in the brain that in turn controls the amount of cortisol produced by the adrenal glands. This is called pituitary-dependent Cushing's. A small percentage of dogs with Cushing's disease have a tumor of one of the adrenal glands which is called adrenal-dependent Cushing's.

There is no single test to diagnose Cushing's disease. The history, physical exam, and results of initial blood and urine tests often provide a strong suspicion for the presence of Cushing's disease. Laboratory tests that are most commonly altered by Cushing's disease are an increase in white blood cell count, increase in the liver enzyme ALP (also called SAP or serum alkaline phosphatase), increased blood sugar (although not as high as the blood sugar levels of diabetic patients), increased cholesterol and dilute urine. See *What Do Those Lab Tests Mean?* (http://www.vetmed.wsu.edu/outreach/Pet-Health-Topics/categories/miscellaneous-health-care-topics/what-do-those-lab-tests-mean) for additional information about laboratory tests.

The large amount of cortisol in the body suppresses the immune system and allows the pet with Cushing's disease to get bacterial infections. The most common location for infection is the bladder. Pets with Cushing's disease may have a silent bladder infection meaning they don't show signs of having the infection such as straining to urinate. A culture of the urine may be necessary to diagnose the infection.

X-rays of the belly often show a large liver. Occasionally the x-ray will show calcium in the area of one of the adrenal glands that is suggestive of an adrenal tumor. Ultrasound of the belly may show enlargement of both adrenal glands in pets with pituitary-dependent Cushing's or enlargement of just one of the adrenal glands in pets with an adrenal tumor. The adrenal glands are NOT always seen during an ultrasound exam in pets with Cushing's. In some pets with an adrenal tumor, the tumor can be seen growing into large blood vessels close to the adrenal gland or spread from the tumor may be seen in the liver.

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Specific tests for Cushing's disease are performed to confirm the diagnosis and to determine the type of Cushing's disease that is present, pituitary-dependent, or adrenal-dependent. Specific tests for Cushing's disease have varied results. In some cases the results are clear cut and the diagnosis is made, but in other cases the test results are not clear cut and a series of tests must be performed. Some of the specific tests for Cushing's disease include urine cortisol/creatinine ratio, low dose dexamethasone suppression test, high dose dexamethasone suppression test, and an ACTH stimulation test.

The treatment of the most common type of Cushing's disease (pituitary-dependent) is lifelong oral medication. The most common drugs used to treat Cushing's disease are o, p'-DDD (also called Lysodren or mitotane) and Trilostane. Occasionally ketoconazole or L-Deprenyl are used to treat Cushing's disease but are less effective than Trilostane or Mitotane. o, p'-DDD is initially given daily or twice daily for about a week (sometimes more, sometimes less). The initial treatment is called induction. o, p'-DDD can have serious side effects, so pets being treated for Cushing's disease must be closely watched. After induction o, p'-DDD is given less often, usually once or twice weekly for the life of the pet. Some pets will have a recurrence of signs of Cushing's disease later in life, even though they are receiving o, p'-DDD. Trilostane tends to have fewer side effects than o, p'-DDD but is more expensive. Discuss with your veterinarian which treatment is best for your pet.

Treatment of adrenal dependent Cushing's disease is by surgical removal of the cancerous adrenal gland. Adrenal gland tumors can spread to other parts of the body in which case all the cancer cannot be removed by surgery. Medical treatment may be given before surgery to reduce hormone levels before surgery. o, p'-DDD is not as effective in reducing signs in pets with adrenal-dependent Cushing's disease as it is in pets with pituitary-dependent Cushing's disease. Trilostane may be effective in controlling the signs of Cushing's in some dogs with adrenal tumors.

The prognosis for pituitary-dependent Cushing's disease with treatment is usually good. Some signs will disappear quickly and others gradually. Appetite and water consumption usually return to normal in a few weeks where as full return of the fur may take several months.

Washington State University assumes no liability for injury to you or your pet incurred by following these descriptions or procedures.

Washington State University is currently the only veterinary hospital in the country performing transsphenoidal hypophysectomy, a surgery used in the treatment of pituitary tumors and other masses near the pituitary gland. The most common pituitary tumor in dogs is a functional pituitary mass that causes Cushing's disease. For cats, the most common pituitary tumor is a functional mass that causes acromegaly, where the pituitary produces too much growth hormone. Dr. Owen has performed transsphenoidal hypophysectomy surgeries on nearly 60 animals over the last five years. She was the first veterinarian in the United States to perform this surgery, initially at VCA West Los Angeles Animal Hospital under the guidance of Adam Mamelak, MD from Cedars Sinai Medical Center, a renowned neurosurgeon and expert on transsphenoidal hypophysectomy.

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Our Surgical Team

Our board certified team, led by pituitary surgical specialist Dr. Tina Owen, includes neurologist Dr. Annie Chen-Allen and critical care specialist Dr. Linda Martin. The team also includes neurology residents and veterinary technicians specializing in surgery, neurology, anesthesia and critical care. We work collaboratively with board certified veterinarians specializing in internal medicine, radiology, and anesthesia to be able to offer our patients the best treatment options.

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