

Canine Cushing's Disease Primer
For Clients of Prairie State Veterinary Clinic

What is Cushing's Disease?

Cushing's Disease (CD), or Cushing's Syndrome, is a hormonal disorder first described by Dr. Harvey Cushing in humans in the early 1900's where there is too much production in the body of the steroid hormone cortisol.

In a dog with CD the adrenal gland, or glands, are producing too much of the steroid called cortisol. Most affected dogs are over 6 years of age.

The majority of cases (85%) are due to a small pituitary gland tumor in the brain, which is inappropriately telling both adrenal glands (there is one adrenal gland next to each kidney) to produce excessive amounts of cortisol. Some of these pituitary gland tumors in the brain (about 15%) can become large enough to cause neurologic signs. Currently there is no one in the US removing these pituitary gland tumors surgically. Cyberknife^R treatment at one of three locations in the US could be considered.

A smaller number (15%) of cases are due to one of the two adrenal glands directly becoming cancerous itself with no involvement of the pituitary gland. The cancerous adrenal gland also produces excessive cortisol. These adrenal gland tumors can be removed surgically, but by the time of diagnosis many have invaded a major blood vessel in the abdomen and require the skill a well-trained surgeon to effect removal. It is a risky and expensive surgery.

Regardless of the underlying cause – the adrenal gland, or glands, are producing **too much cortisol** (cortisone, like prednisone).

Clinical signs can include some of the following: excessive thirst, excessive urination, excessive panting, excessive appetite, abdominal enlargement (due to weakening of the abdominal muscles and enlargement of the liver), possible thinning or loss of hair, muscle weakness, dribbling of urine, especially when the dog is asleep, lethargy, darkening of the skin, and in the case of a pituitary gland tumor enlarging in the brain, stupor, incoordination, circling, aimless wandering, increased respiratory rate, and stiff gait.

Reasons to treat the disease: All of the above; **plus** dogs with CD are at risk for blood clots in the lungs (pulmonary thromboembolism), development of diabetes (due to cortisol-induced insulin resistance) and development of hypertension.

What is the first step in diagnosis if there is a suspicion of CD?

The first step if there is a suspicion of Cushing's is to perform a urine cortisol test (**urine cortisol/creatinine ratio**). This is an inexpensive screening test performed on urine. If the cortisol level in the urine sample is low, you can rule out CD. If the cortisol level in the urine is elevated past a certain value then the suspicion for the disease is increased. It is prudent to run the basic panel of complete blood count, chemistry and urinalysis at this time.

What is the second step?

If the urine cortisol is elevated the next step is to do a blood test that takes 8 hours to perform in the clinic. A blood sample is drawn at 9 AM, an injection of cortisol is given in the vein and two more samples are taken, one at 4 hours and another 8 hours later. The results of this **Low Dose Dexamethazone Suppression Test** will confirm if Cushing's is present.

What is the third step if Cushing's is diagnosed?

If CD is diagnosed we still don't know if the disease is due to a pituitary (brain) tumor or an actual adrenal gland tumor. To many people, it makes no difference because if it is an adrenal gland tumor they will likely choose to not pursue the surgery. For those who would want to pursue removal of an adrenal gland tumor, the next step would be to perform an abdominal ultrasound at a specialty practice to determine which adrenal gland is enlarged and needs to be removed. The removal of an adrenal gland tumor can result in a cure with no need for long-term medication. If a client chooses not to do the ultrasound, or pursue the end-point diagnosis, the medical treatment for both forms of the disease (blocking cortisol production) is the same.

What is the fourth step?

Once a decision to treat is made, the dog is started on a medication to block the production of cortisol from the adrenal gland(s). The medication (**trilostane**) is given twice daily. We use a compounded butterscotch-flavored liquid, which is applied directly to the food or into the mouth.

What is the fifth step?

Two weeks after trilostane is started the dog is returned to the clinic for a **physical exam and consultation**. If problems have developed in the first two weeks an ACTH Stimulation Test and serum electrolytes should be performed. If everything is going well and no problems have developed (the norm) the dog is returned in another two weeks (**four weeks after starting the medication**) for **serum electrolytes, a urine cortisol level and an ACTH Stimulation Test**. Some veterinarians run only the ACTH stimulation test at this time if the dog is doing fine and cost is an issue. The results of these tests will allow the veterinarian to properly adjust the medication. The goals of therapy include clinical improvement, a normal urine cortisol level and lack of an exaggerated adrenal response to ACTH challenge.

During the initial days of treatment it is important for the owner to watch for signs of weakness, vomiting, loss of appetite and marked decrease in water intake, all of which could signal that the dog is too sensitive to the starting dose. This is a rare occurrence.

What is the maintenance protocol?

Once control of the hyperadrenal state is attained, an ACTH stimulation test, serum electrolytes and urine cortisol level should be evaluated every 3 to 4 months. Some veterinarians run only the ACTH stimulation test at this time if the dog is doing fine and cost is an issue. After some time, if the dog is doing well, most people only test twice yearly regardless of the recommendation.

What is the long-term outlook?

If the disease was caused by an actual adrenal gland tumor and it is removed, the mean survival time ranges from 492 to 953 days with some dogs living 4 – 5 years after surgery. If the disease is caused by an actual adrenal gland tumor and it is not removed, but treated with trilostane, the survival time is 92 – 528 days. If the disease is caused by the pituitary dependant form of the disease (as it is in 85% of the dogs) the average survival time is 30 months.

What are the anticipated longer-term costs?

The basic cost will be the **cost of the medication**, which varies with the body weight of the dog **and any testing** that is decided upon between the veterinarian and the owner. The cost of medication fluctuates based upon marketing decisions made by drug distributors and compounding pharmacies. We have seen the cost be as little as one dollar per pound of body weight per month up to 1.50 per pound of body weight per month. Other current fees are as follows: CBC, Chem 27, Urinalysis (Code 1850): \$167.13; ACTH Stimulation Test: \$239.00; Urine Cortisol/Creatinine ratio test: \$78.15; Electrolyte Profile: \$73.14.