

LePar Animal Hospital  
3811 W. 95<sup>th</sup> St.  
Evergreen Park, IL 60805  
708-423-3200  
www.leparvet.com

## CUSHING'S DISEASE

### ***What is Cushing's Disease?***

Cushing's Disease is a condition in which the adrenal glands overproduce certain hormones. The medical term for this disease is *hyperadrenocorticism*.

The adrenal glands produce several vital substances, which regulate a variety of body functions and are necessary to sustain life. The most widely known of these substances is *cortisol*, commonly known as cortisone. Decreased or excessive production of these substances may be life-threatening.

### ***How Does this Disease Occur?***

There are three mechanisms by which this disease can occur. Regardless of the cause, the clinical signs are essentially the same. If possible, we recommend further testing (ie. Low dose dexamethasone/ ultrasound) to identify the type of Cushing's Disease because the various forms are treated differently and have different prognoses. If cost is prohibitive, we will recommend treating for the most common cause of Cushing's disease, a pituitary tumor, prior to further testing. Below are the three forms.

**Pituitary gland tumor.** The most common cause of Cushing's Disease (**85% of all cases**) is a tumor of the pituitary gland. The tumor may be either benign or malignant. The tumor causes the pituitary to overproduce a hormone that stimulates the adrenal glands. Excessive cortisol secretion then occurs. The tumor may be microscopic or quite large. Depending on the size of the tumor, clinical signs other than Cushing's Disease may be present. Generally, if the activity of the adrenal gland can be controlled, many dogs with this form of Cushing's Disease can live normal lives for many years as long as they take their medication and stay under close medical supervision. Growth of the pituitary tumor would give the patient a less favorable prognosis.

**Adrenal gland tumor.** Cushing's Disease may be the result of a benign or malignant tumor of the adrenal gland. If benign, surgical removal cures the disease. If malignant, surgery may help for a while, but the prognosis is less favorable than for a benign tumor.

**Iatrogenic.** Iatrogenic Cushing's Disease means that the excess of cortisol has resulted from excessive administration of a steroid. This may occur from oral or injectable medications. Although the injections or tablets were given for a legitimate medical reason, their excess is now detrimental.

### ***What Are the Clinical Signs?***

The most common clinical signs associated with Cushing's Disease are an increase in appetite, water consumption, and urination. Lethargy, or lack of activity, and a poor hair coat are also common. Many of these dogs develop a bloated appearance to their abdomen due to an increase of fat within the abdominal organs and a stretching of the abdominal wall as the organs get heavier. The pot-bellied appearance also develops because the muscles of the abdominal wall become weaker. Panting is another common finding with this disease.

### ***How is it Diagnosed?***

A number of tests are necessary to diagnose and confirm Cushing's Disease. The two most common tests to detect Cushing's Disease are the ACTH Stimulation Test and the Low-Dose Dexamethasone Suppression Test (both are approximately \$200-250). Other tests may be needed to decide which form of the disease is present. An adrenal panel in difficult to diagnose cases (\$400-450), or an ultrasound examination can be a valuable part of the testing

process (approximately \$310). This permits visualization of the adrenal glands and determines their size and the presence of a tumor. Although some of these tests are somewhat expensive, they are necessary.

## ***What Are the Treatment Options?***

### **Iatrogenic Cushing's Disease**

Treatment of this form requires a discontinuation of the steroid that is being given. This must be done in a very controlled manner so that other complications do not occur. Unfortunately, it usually results in a recurrence of the disease that was being treated by the steroid. Because there may have been adverse effects on the adrenal glands, treatment is also needed to correct that problem.

### **Adrenal Tumor**

Treatment of an adrenal tumor requires major surgery. Although this is a high risk surgery, if successful and the tumor is not malignant, there is a good chance that the dog will regain normal health. If surgery is not an option, some of these patients can be managed with the medication discussed next. Fortunately, only 10% of dogs have this type of Cushing's Disease.

### **Pituitary Tumor**

**Lysodren™** is the primary drug used to destroy the abnormal adrenal gland tissue. Lysodren™ is also known as mitotane or *o,p'*-DDD. If not enough drug is used, the abnormal tissue persists and the disease continues. If too much is used, most or all of the adrenal cortex will be destroyed, which can be life-threatening. Therefore, careful monitoring of the dog is necessary in order to achieve good results. Because the pituitary is not being affected by the treatment, it continues to stimulate the adrenal gland. This means that continued treatment is necessary. The tablets cost approximately \$4-5/tablet, and depending on size an initial dosing for 10 consecutive days, may run from \$30-150. Once maintenance is reached tablets are usually needed only every 10-14 days.

**Trilostane** is a newer alternative to lysodren. It is a synthetic steroid analogue. It is a competitive inhibitor of 3  $\beta$ -hydroxysteroid dehydrogenase enzyme system and thus interferes with adrenal steroid biosynthesis. Dose: 2-5 mg/kg daily oral dosage can be adjusted according to response. Treatment can be monitored using the ACTH stimulation test every 3-4 months trying to get the post stimulation cortisol down to below 120 nmol/l starting 2 to 4 hours after oral administration. In some individuals trilostane may need to be given twice daily. It can also be monitored more passively/less frequently, if owner opts pending patient response.

Trilostane should be used with caution in dogs with impaired renal function and may cause reversible hypoadrenocorticism in some dogs. Hypoadrenocorticism does occur with over-dosage, but should resolve on withdrawal of the drug. Pregnant women should wear gloves and all users should wash their hands after handling the drug. Cost can vary and is usually more expensive than lysodren.

## **INSTRUCTIONS FOR LYSODREN TREATMENT OF CUSHING'S DISEASE**

Treatment of this form involves an *initiating phase* and a *maintenance phase*. The *initiating phase* arrests the disease and restores the dog to a more normal state. Some of the clinical signs, especially increased food and water intake, should stop within the first 1-3 weeks. Other signs, such as a poor hair coat or a bloated abdomen, may take several weeks or months to correct. The *maintenance phase* represents the phase of long-term therapy. This phase lasts the rest of the dog's life.

You must continually monitor your dog's food and water intake. Our goal is to have them return to normal. If we have not informed you how much your pet should drink for his weight use the following measurement to estimate his/her normal level: water intake should be less than 1 oz per pound (66 cc per kilogram) of body weight per day. The amount of food should also be measured each day so you can determine if he/she begins to eat less. At least two feedings per day are preferred.

## Initiating Phase

**1.** Give Lysodren™ tablet(s) 2 times per day or as instructed on bottle, for 10 days (or as instructed by your veterinarian) or until one of the following occurs:

- a) Your dog's water intake drops to the 1 oz per pound (66 cc per kilogram)
- b) Your dog's appetite returns to normal or it takes 15-30 minutes to eat when it would normally eat in much less time.
- c) Your dog does not eat a regular meal.
- d) Your dog vomits.
- e) Your dog has diarrhea.
- f) Your dog becomes unusually listless.

**2.** Return in 20 days starting from the 1st day of medication or ten days after you stopped the lysodren whichever comes sooner, for an ACTH stimulation test. This test should be done early in the morning and will require your dog to be in the hospital for about 4-5 hours. If the test is abnormal, the initiating phase will continue. If the test is normal, the maintenance phase will begin.

**3.** If loss of appetite, vomiting, diarrhea, or listlessness occurs, use the prednisone that has been prescribed by your veterinarian as directed on label. Please call us if this happens.

**4.** Report any other changes in your dog's behavior that are out of the ordinary. This disease and this treatment can result in several abnormal behaviors. However, your dog can also have other diseases that occur concurrently but independently of Cushing's Disease. It is important that we differentiate between the two situations so that proper treatment can be taken.

**5.** Stay cautiously optimistic. This is a serious disease, but many dogs with Cushing's Disease enjoy a greatly improved quality of life for many years.

## Maintenance Phase

When regulated, your dog will take Lysodren™ approximately for one day every 7-14 days. An ACTH stimulation test will be necessary about every 3 to 12 months to be sure that regulation is satisfactory. At the appropriate time, the specifics of the maintenance phase will be explained.