

# CANINE CUSHING'S DISEASE

## *What is Cushing's Disease?*

Cushing's Disease is a disease 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. Both too much (Cushing's disease) or too little (Addison's disease) cortisol can cause significant illness in dogs.

## *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. It is important to identify the cause, however, because the various forms are treated differently and have different prognoses.

**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, which stimulates the adrenal glands and excessive cortisone secretion results. The tumor may be either microscopic or quite large. Depending on the size of the tumor, the presence of signs other than Cushing's will be variable. Generally, if the activity of the adrenal gland can be controlled, 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 cortisone has resulted from excessive administration of cortisone. This may occur from oral, injectable or very rarely topical medications. Although the medications 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 a tremendous 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?*

When Cushing's disease is suspected screening labwork, including a chemistry and complete blood count, will be performed. Although they cannot confirm the diagnosis, these tests will often show changes in specific values that make a diagnosis of Cushing's disease more likely.

The primary test for Cushing's disease is the Low Dose Dexamethasone suppression test. For this test the dog is given a low dose of a steroid called Dexamethasone. Three measurements of cortisol level are taken, one before the steroid injection, then at four and eight hours. In a normal dog the pituitary gland will recognize the steroid injection and produce less ACTH, causing the adrenal glands to produce less cortisol. In a dog with Cushing's disease either the pituitary gland, or the adrenal glands will fail to respond to the injection and the cortisol level will remain high.

Once Cushing's disease is confirmed, a secondary test, the High Dose Dexamethasone suppression test, may be needed to diagnose an adrenal tumor. An ultrasound examination can also be a valuable part of the testing process. This permits us to visualize the adrenal gland tumor and determine its size. Although some of these tests are expensive, they are necessary to determine the best course of treatment.

### *What are the treatment options?*

**Iatrogenic Cushing's Disease:** Treatment of this form requires a discontinuation of the cortisone that is being given. This must be done in a very controlled manner so that other consequences do not occur. Unfortunately, it usually results in a recurrence of the disease that was being treated by the cortisone.

**Adrenal Tumor.** Treatment of an adrenal tumor requires major surgery. Although this surgery is dangerous to the dog, if it is 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 can be well managed with the medication discussed next.

**Pituitary Tumor:** Treatment of the pituitary-induced form of Cushing's Disease is the most complicated. There are two drugs currently available for treatment, Lysodren and Vetoryl.

Lysodren, also known as mitotane, works by destroying excess adrenal tissue. The drug is given as a initial high "induction" dose that destroys the majority of the abnormal tissue. Once the cortisol has reached a more normal level, a lower weekly maintenance dose is given. Because an overdose can destroy too much tissue, leading to potentially life threatening complications, careful monitoring is required during the induction period.

Vetoryl, more commonly known as trilostane, works by inhibiting an enzyme responsible for the production of cortisol in the adrenal glands. This medication is given once to twice daily. Because in most cases the effects of Trilostane are reversible once the medication is discontinued, it is often considered the safer of the two drugs. There are however, a certain number of dogs in which Trilostane causes necrosis, or death, of the cells in the adrenal glands leading to too little cortisol production. For this reason close monitoring is also required in first few months of use.

Dogs on either Lysodren or Trilostane are monitored with a test called the ACTH stimulation test. For this test the dog is given an injection of a hormone called ACTH, normally produced by the pituitary gland, which tells the adrenal glands to produce cortisol. Two cortisol levels are measured both before and two hours after the injection. If treatment is successful the cortisol level should stay the same throughout the testing and not increase.

## MONITORING YOUR DOG DURING MEDICAL TREATMENT OF CUSHING'S DISEASE

### Lysodren:

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. We expect both to return to a normal level.

### Initiating Phase

1. Give \_\_\_\_\_ Lysodren™ tablet(s) one time per day beginning on \_\_\_\_\_ for \_\_\_\_\_ days or until one of the following occurs:
  - a) Your dog's appetite returns to normal or it takes 15-30 minutes to eat when it would normally eat in much less time.
  - b) Your dog does not eat a regular meal.
  - c) Your dog vomits.
  - d) Your dog has diarrhea.
  - e) Your dog becomes unusually listless.
2. Return in \_\_\_\_\_ days or when one of the above occurs 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 2-3 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, give \_\_\_\_\_ tablet(s) (\_\_\_\_\_ mg) of prednisone twice daily for two days. DISCONTINUE THE LYSODREN TABLETS. If vomiting prevents oral administration, your dog must be seen by a veterinarian for administration of proper medication by injection. When you begin this treatment, please call us for consultation and instructions.
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 once weekly. An ACTH stimulation test will be necessary about every 4-6 months to be sure that regulation is satisfactory. At the appropriate time, the specifics of the maintenance phase will be explained.

Give \_\_\_\_\_ tablet(s) every \_\_\_\_\_ days.

### **Vetoryl/Trilostane**

Treatment with this drug involves continued daily medication. 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. This treatment last the rest of the dog's life.

1. Give \_\_\_\_\_ Vetoryl tablet(s) \_\_\_\_\_ time(s) per day. Monitor your pet for the following signs.
  - a) Your dog does not eat a regular meal.
  - b) Your dog vomits.
  - c) Your dog has diarrhea.
  - d) Your dog becomes unusually listless.
2. Return in \_\_\_\_\_ days or when one of the above occurs 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 2-3 hours. If the test is abnormal, a dose change will be made.
3. If loss of appetite, vomiting, diarrhea, or listlessness occurs, give \_\_\_\_\_ tablet(s) (\_\_\_\_\_ mg) of prednisone twice daily for two days. **DISCONTINUE THE TRILOSTANE TABLETS.** If vomiting prevents oral administration, your dog must be seen by a veterinarian for administration of proper medication by injection. When you begin this treatment, please call us for consultation and instructions.
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.
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