

## **Cushing's Disease in Dogs (Hyperadrenocorticism)**

Cushing's Disease is a disorder in which the adrenal glands overproduce certain hormones. Another medical term disease for this disease is *hyperadrenocorticism*. There are two adrenal glands, one on each side of the abdomen; they are located just above each kidney. The pituitary gland is at the base of the skull and stimulates the adrenal glands to produce.

### **Prevalence**

Spontaneous Cushing's is common in dogs over 6 years of age. The average age of onset is approximately ten years of age.

For pituitary-dependent Cushing's (PDH), as described below, there are breeds which have an increased incidence of the disease. These breeds include all Poodle breeds, German Shepherd dogs, Beagles, Labrador Retrievers, Dachshunds, Boxers, and some Terrier breeds, including Boston Terriers. It occurs with equal frequency in male and female dogs.

For adrenal-dependent Cushing's (ADH), as described below, the disease is more common in female dogs and in the larger breeds. These breeds which appear most often affected with ADH include Poodles, German Shepherd dogs, Dachshunds, Labrador Retrievers, and terriers.

### **Causes/Transmission**

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, because the various forms are treated differently.

**Iatrogenic.** Iatrogenic Cushing's Disease means that the excess of cortisone has resulted from excessive administration of a cortisone-containing drug. Although the injections or tablets are given for a legitimate medical reason, excess can be detrimental.

**Pituitary gland tumor (PDH).** The most common cause of Cushing's Disease (80 - 85% of all cases) is a benign tumor of the pituitary gland; it is rare for these tumors to be malignant. The tumor causes the pituitary to overproduce a hormone that, in turn, stimulates the adrenal glands. Depending on the size of the tumor, the presence of signs other than Cushing's will be variable. It is hoped that if the activity of the adrenal gland can be controlled, the dog will live a relatively normal life.

**Adrenal gland tumor (ADH).** In 15-20% of cases, Cushing's Disease is 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.

### **Clinical Signs**

The most commonly reported clinical signs associated with Cushing's disease are a tremendous increase in appetite, water consumption, and urination. Lethargy (lack of activity), panting, and muscular weakness are also seen in many cases. Problems related to the skin and hair coat include thin, easily bruised skin, loss of hair (alopecia), and excessive pigmentation. Many of these dogs appear to have a bloated abdomen. There are two primary causes for this. The liver grows quite large with all types of Cushing's; this enlargement is called *hepatomegaly*. At the same time, the muscles of the abdomen are weaker and unable to adequately support the liver. With time, the dog develops a very pendulous-looking abdomen.

### **Diagnosis**

A number of tests are necessary to diagnose and confirm Cushing's Disease. The most common initial tests are either the ACTH stimulation test or the low-dose dexamethasone suppression test. These tests are used to confirm that the dog has Cushing's. Abdominal ultrasound will also allow the veterinarian to see the adrenal glands directly and try to visualize the size.

Frequently, additional tests are needed to discriminate between the various forms of Cushing's (PDH vs. ADH). The main discriminatory tests are called the high-dose dexamethasone test and the ACTH assay.

## **Treatment**

**Iatrogenic Cushing's Disease.** Treatment of this form requires discontinuation of the cortisone-containing medication. This must be done in a very controlled manner so that side-effects do not occur from withdrawal of the drug. Unfortunately, stopping the cortisone can result in recurrence of the disease that was being treated by the cortisone. .

**Pituitary Tumor** Treatment of PDH is designed to either block the side effects of the steroids or destroy the part of the adrenal cortex so that excessive cortisone will no longer be produced. Ketoconazole, an anti-fungal drug that blocks the body's ability to respond to the steroid and will decrease the clinical signs. The drug, Lysodren™, is used to destroy the adrenal 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. Although a cure is not achieved, control is possible for many years if the tumor is small. If the tumor is large, local effects of the tumor invading surrounding tissues in the head can be the limiting factor in survival. The drug, called Anipryl™, does not offer the dramatic improvement more typically seen with Lysodren™, but is another option.

**Adrenal Tumor** Treatment of an adrenal tumor requires treatment with Ketoconazole, Lysodren™ and/or major surgery. With some adrenal tumors, especially the benign form (adenoma), good results can be achieved with drug therapy alone. In some cases, surgery is indicated for purposes of obtaining a biopsy and/or attempting to remove the tumor mass. This surgery is potentially very dangerous to the dog, even when performed by skilled surgeons, because the tumor is typically surrounded by large blood vessels.

## **Prognosis**

Dogs with ADH caused by a benign tumor have a good prognosis whereas the prognosis is guarded with the malignant form (adenocarcinoma). The prognosis with PDH is variable depending upon whether the tumor is a small tumor (microadenoma) or large tumor (macroadenoma), presence of concurrent medical problems, and willingness of the owner to continue with treatment and monitoring.