Canine Hyperadrenocorticism (Cushing’s disease)

Canine hyperadrenocorticism, commonly referred to as Cushing’s disease, is a hormonal disorder of dogs. Clinical signs result from an overproduction of a hormone called cortisol, which is produced by the adrenal glands. An overview of normal adrenal physiology, types of Cushing’s disease, clinical signs, and diagnosis will contribute to an understanding of this manageable endocrine disorder.

The adrenal cortex produces 3 groups of hormones commonly referred to as “corticosteroids” or just “steroids”. In a normal dog the hypothalamus produces corticotropin-releasing hormone (CRH) in response to stressful situations, like visiting the vet or meeting a new dog. CRH tells the anterior pituitary to produce adrenocorticotropic hormone (ACTH); ACTH travels to the adrenal gland and stimulates the release of cortisol. Cortisol works throughout the body to boost the metabolism and provide anti-inflammatory and immunosuppressive effects. When circulating cortisol levels remain high they act as a signal, or “negative feedback” mechanism, to the hypothalamus to stop producing CRH, which prevents the process from starting over again. Negative feedback acts as a checks and balances system for the body to prevent excess cortisol from being produced.

It may be helpful to think of it as a game of telephone among the hypothalamus, the pituitary, and the adrenal gland. It is important for each of them to send and receive the right messages. In some cases the pituitary gets it wrong. Pituitary-dependent hyperadrenocorticism (PDH) accounts for 85% of dogs diagnosed with Cushing’s disease. A slow-growing, benign
pituitary tumor called an adenoma causes the pituitary to produce an excess amount of ACTH, resulting in excess Cortisol production by the adrenal gland. In other cases, a tumor on the adrenal gland itself produces excess cortisol, regardless of signals received from the hypothalamus and pituitary. Adrenal-dependent hyperadrenocorticism (ADH) accounts for 15% of dogs diagnosed with Cushing’s disease. Occasionally, Cushing’s disease can be iatrogenic, meaning induced; symptoms in these cases occur secondary to administration of exogenous (not produced within the body) glucocorticoids for treatment of another disorder.

The overproduction of cortisol causes the clinical signs associated with Cushing’s disease. Most commonly you will see increased urination, increased water intake, increased appetite, a pot-bellied appearance, panting, and hair loss. These symptoms are also seen in other diseases that may affect older dogs and it will be necessary for your veterinarian to perform at least one screening test and a differentiating test to confirm a diagnosis of Cushing’s disease and determine where the signals are getting crossed, respectively. Supportive tests that your veterinarian may mention include urine cortisol:creatinine ratio (UCCR), low-dose dexamethasone suppression test (LDDST), and ACTH stimulation test. LDDST, high-dose dexamethasone suppression test (HDDST) and endogenous ACTH measurement can be used to determine if the Cushing’s disease is pituitary dependent, adrenal dependent, or iatrogenic.

There is no cure for Cushing’s disease; however, it can be medically managed. Treatment is primarily aimed at resolution of clinical signs, improvement in quality of life for you and your pet, and reduction of the risks associated with uncontrolled disease. Cushing’s disease that goes untreated may result in secondary infections, diabetes mellitus, pancreatitis, and in some cases, life-threatening pulmonary thromboembolism. Treatment options for patients with clinical signs depend on the type of Cushing’s disease, concurrent health conditions, and level of financial
commitment. The prognosis for a dog with Cushing’s disease is good when working closely with your veterinarian to develop an effective treatment plan and closely and consistently monitoring clinical signs and circulating cortisol concentrations.

References


