

Just Veterinary*e- Magazine***Volume - 1****Issue - 3****September-October, 2025****www.justveterinary.co.in****AUTHORS' DETAILS:****Amit Singh Vishen**

Assistant Professor,
Department of Veterinary
Anatomy, College of Veterinary
& Animal Sciences, Datia, M.P.
(RLBCAU, Jhansi, U.P.)

Aditya Kumar

Associate Professor,
Department of Veterinary
Anatomy, College of Veterinary
& Animal Sciences, Datia, M.P.
(RLBCAU, Jhansi, U.P.)

Deeksha Maletha

Assistant Professor
Cum Junior Scientist,
Department of Veterinary
Pharmacology & Toxicology,
College of Veterinary Sciences &
Animal Husbandry, Ranchi
(Birma Agricultural University,
Kanke, Ranchi, Jharkhand)

Shashi Choudhary

M.V.Sc. Scholar,
Department of Veterinary
Anatomy, College of Veterinary
& Animal Sciences, Datia, M.P.
(RLBCAU, Jhansi, U.P.)

Jitendra Yadav

M.V.Sc. Scholar,
Department of Veterinary
Anatomy, College of Veterinary
& Animal Sciences, Datia, M.P.
(RLBCAU, Jhansi, U.P.)

ARTICLE ID: 01**HORMONAL IMBALANCE DURING STRESS IN PET
ANIMALS****Introduction**

Stress is defined as the alteration of physiological response of the animal under stressful conditions which leads to disturbance in homeostasis or it may be defined as any situation which tends to disturb the equilibrium between a living organism and its environment. The term *stress* has been derived from the Latin word *stringere*, meaning to draw tight. Hans Selye, a pioneering Hungarian- Canadian endocrinologist, first introduced the concept of stress as 'the non-specific response of the body to any demand'. Stress is a reflex reaction revealed by the inability of an animal to cope with its environment which may lead to many unfavorable consequences, ranging from discomfort to death. It covers the behavioral and biological responses to a wide range of stresses like climatic, physiological, pregnancy, lactational, pathological, nutritional, psychological and managemental stress etc.

Climatic stress in pets is seen while changing in the ambient temperature of the surrounding (heat or cold stress), humidity, wind velocity, solar radiations, the sun shine or day light hours etc. Physiological stress is seen while putting pets on excessive exercise that increases temperature and electrolyte imbalance takes place that leads to hormonal imbalance in pets. At the time of pregnancy and lactation there is extra burden on female dogs so stress appears that affects productivity. Pathological stress is caused by many infectious, non infectious and pathological diseases that affect the pets that lead to disturbance in the homeostasis. Nutritional stress arises when we give improper diet deficient in mineral mixtures and vitamins to pets. Psychological stress is seen in healthy pets while death of any puppy or the dog owner because at that time dogs stop eating or they get feared that leads to metabolic disturbances also. Managemental stress is prevalent when we are not giving feed to pets at the right time or proper feed amount is missing or improper ventilation and space where pet dogs live.

The hormones which are affected by stress are adrenal hormones i.e. cortisol and aldosterone hormones and thyroid hormones.

Adrenal gland: Cushing's Disease (Hyperadrenocorticism) is caused by an increase in circulating levels of the hormone cortisol. Cortisol is produced by the adrenal glands. The adrenals produce cortisol in response to being stimulated by the pituitary gland, which is located at the base of the brain. Cortisol is normally produced in times of stress to prepare the body for a flight or fight response. Clinical signs of the disease include excessive thirst and urination, increased appetite, lethargy, panting, abdominal bloating, hair loss and recurrent infections. Treatment involves medication to control the overproduction of cortisol by the adrenal glands and sometimes adrenal gland surgery. Ongoing blood testing for maintenance and medication dose monitoring is required.

Addison disease (Hypoadrenocorticism) is caused by a deficiency of adrenal gland hormones. It is most common in young to middle-aged dogs. The cause is usually not known but an autoimmune condition in which the body destroys some of its own tissue is likely. The adrenal gland can also be destroyed by other conditions including medications used to treat Cushing disease and cancer in other parts of the body. Secretion of aldosterone, the main mineralocorticoid hormone is reduced which affects the levels of potassium, sodium, and chloride in the blood.

Signs of Addison disease include repeated episodes of vomiting and diarrhea, loss of appetite, dehydration, and a gradual loss of body condition. An adrenal crisis is a medical emergency and requires treatment with intravenous fluids to restore levels of body fluids, salt, and sugar to normal. Hormone replacement treatment can often be started while the pet is being stabilized. Laboratory values are monitored regularly to assess response to treatment and adjust doses if needed.

Thyroid gland: Hypothyroidism results from a decrease in thyroid hormone (T3, T4 and TSH) production by the thyroid glands. It is more common in middle-aged and older dogs. A decreased amount of thyroid hormone results in lethargy and sleepiness. Changes in skin and coat are common i.e. the skin often becomes thickened and more pigmented and the hair coat can become dull, dry and sparse. Dogs with hypothyroidism can also be prone to skin infections and experience poor wound healing. Treatment is by administering oral thyroid supplements.

Other glands and their hormones affected by hormonal imbalance:

Pancreas: *Diabetes mellitus* is caused by a deficiency of insulin hormone that is secreted by pancreas. All the cells of the body require fuel to function, and glucose is one of the essential fuels. Tissues cannot absorb glucose without insulin. When there is insufficient insulin, the glucose stays in the bloodstream and cannot be taken into the cells and used by the body. The tissues go into starvation mode, resulting in increased appetite and weight loss. Glucose also moves into the urine in high amounts, drawing water with it and causing excessive urination and thirst. All that sugar in the urine also creates a very suitable environment for bacteria to grow, making urinary tract infections common. If high amounts of glucose enter the lens of the eye, cataracts can also develop, leading to blindness.

The main symptoms of *Diabetes mellitus* in dogs are excessive hunger, excessive thirst, excessive urination and weight loss. Nearly every dog will have insulin-dependent diabetes, similar to the human type 1 diabetes. High fibre diets are preferred for feeding diabetic dogs, as they slow the absorption of sugars and help maintain blood glucose levels. Diabetic dogs are best fed twice

daily 12 hours apart and injected with insulin after eating meals.

Parathyroid gland: It produces Parathormone and excess of this hormone leads to Hypercalcemia that is an abnormally high level of calcium in the blood. Excessive calcium in the blood is harmful to all tissues but especially the kidneys, nervous system, heart, and blood vessels. The most common signs are increased thirst and urination, followed by reduced appetite, vomiting, constipation, weakness, depression, muscle twitching and seizures. It is treated by including fluids, diuretics and glucocorticoids to lower the level of calcium in the blood.

Hypocalcemia is an abnormally low level of calcium in the blood leading to twitching, muscle tremors and seizures. The causes of hypocalcemia include previous surgical removal of the parathyroid glands (leading to hypoparathyroidism), kidney disease or failure and calcium imbalance in nursing females. It is characterized by low calcium levels and high phosphate levels. The goal of treatment is to return the level of blood calcium to normal and to eliminate the underlying cause. If an animal is having muscle spasms or seizures because of low calcium levels then immediate treatment with intravenous calcium is needed. Dietary supplements of calcium often along with vitamin D are prescribed for long term treatment.

Pituitary gland: Diabetes insipidus is caused by problems with antidiuretic hormone (ADH) or vasopressin. These hormones are responsible for maintaining the correct level of fluid in the body. Either the pituitary gland does not secrete enough of this hormone (called central Diabetes insipidus), or the kidneys do not respond normally to the hormone (called Nephrogenic Diabetes insipidus). Affected dogs urinate in large volumes and drink equally large amounts of water. The urine is very dilute even if the animal is deprived of water. Increased urination may be controlled using Desmopressin acetate that is a drug that acts in a way similar to antidiuretic hormone. Water should not be restricted. Treatment is usually lifelong in this hormonal imbalance.

Conclusion:

In today's competitive modern world one encounters stress in various aspects of life. As an adaptive response to stress, there is a change in the serum level of various hormones including CRH, cortisol, catecholamines and thyroid hormone. These changes may be required for the fight or flight response of the individual to stress. However, long-term exposure to stress may lead to many deleterious consequences leading to various endocrine disorders. Also, stress leads to change in the clinical course or status of many endocrine conditions.