Dietary Management of Feline Endocrine Disease

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KEYWORDS

• Feline • Hyperthyroidism • Diabetes mellitus • Diet • Protein • Carbohydrate

KEY POINTS

- Hyperthyroidism is a hypermetabolic state that has profound effects on multiple organ systems (body condition, muscle, endocrine pancreas, parathyroid, and kidney).
- To best accomplish nutritional goals, hyperthyroid cats should be fed a diet containing a large amount of dietary protein (>40% of daily calories or metabolizable energy [ME] as protein; >12 g/100 kcal), a small amount of carbohydrate (<15% of total calories or ME; <4.5 g/100 kcal), and a moderate amount of phosphate (<250 mg of phosphate per 100 kcal).
- Dietary management plays a key role in the successful management of diabetic cats and should be used in conjunction with long-acting insulin treatment both to improve diabetic control and to help induce diabetic remission.
- Because cats are obligate carnivores, diabetic cats are carbohydrate intolerant and respond best to a low-carbohydrate diet (<12% ME; <3.5 g/100 kcal).
- Because diabetes is a catabolic state, weight loss, muscle wasting, and poor muscle condition scores are common in diabetic cats; therefore, feeding high-protein diets (>40% ME; >12 g/100 kcal) is recommended to help maintain muscle mass.

INTRODUCTION

When treating cats with endocrine disease, most veterinarians concentrate on medical or surgical treatments that can be used to manage or cure the disease. Dietary issues are frequently ignored or not properly addressed. However, nutritional support can play an integral role in the successful management of feline endocrine diseases.

This article discusses the 2 most common endocrine problems of cats seen in clinical practice (ie, hyperthyroidism and diabetes mellitus) and discusses the way

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nutrition can be integrated into the management of these common feline diseases. The goal is to use the cat's diet as a means to support its overall body health and metabolism and, therefore, help manage its underlying endocrine disease.

HYPERTHYROIDISM IN CATS

Hyperthyroidism is the most common endocrine disorder of cats, and is one of the most common medical problems seen in small animal practice, affecting approximately 10% of all senior and geriatric cats more than 10 years of age.[1–3] Despite nutritional factors and cat food having been proposed to have a role in the etiopathogenesis of this disease,[4,5] there are only limited published recommendations about what to feed these cats. The question of what to feed a hyperthyroid cat is commonly asked by concerned cat owners.

The Many Metabolic Problems Facing the Hyperthyroid Cat

When secreted in excess, thyroid hormones have profound metabolic effects on the body, and dysfunction of multiple organ systems (central nervous, cardiac, gastrointestinal, hepatic, pancreatic, and renal systems) is common in hyperthyroid cats.[1–3,6]

Weight loss and muscle wasting

Despite a normal to increased appetite, weight loss is the classic and most common sign seen in cats with hyperthyroidism.[1–3,6] These cats lose weight because their hyperthyroidism accelerates their metabolic rate such that energy demand exceeds energy consumption. It is important to realize that hyperthyroidism is a catabolic state.[7,8] The progressive weight loss and muscle wasting that is so characteristic of feline hyperthyroid disease is caused by increased protein catabolism leading to a negative nitrogen balance.[9–11]

When hyperthyroid cats first lose weight, the disorder can usually be first noticed as a loss of muscle mass in the cat's lumbar paravertebral area. Despite this loss of muscle mass, most mildly hyperthyroid cats retain their abdominal adipose tissue during the initial stages of their thyroid disease and may even have a higher than ideal body condition score (BCS). With time, severe muscle wasting, emaciation, cachexia, and death from starvation can occur if the cat's hyperthyroidism is left untreated.[1,2]

In hyperthyroidism, the cat's body consumes its own muscle tissue to meet its protein needs. Even with treatment of hyperthyroidism, recovery of muscle mass and function may be prolonged, lasting several weeks to months.[9] This is especially true if these cats are not provided with enough dietary protein to help rebuild their lost muscle mass.[12]

Hyperglycemia, glucose intolerance, insulin resistance, and overt diabetes

In both humans and experimental animals, thyroid hormone excess affects many aspects of metabolism and energy homeostasis, including the development of glucose intolerance and insulin resistance.[13,14] Hyperthyroid cats also develop changes in glucose and insulin metabolism. Mild to moderate hyperglycemia is common in hyperthyroid cats, which is generally attributed to a stress reaction.[1–3] However, the underlying metabolic changes reported in hyperthyroid cats are more complicated: hyperthyroidism frequently causes moderate to severe endogenous insulin resistance, as shown by high resting serum insulin concentrations and an exaggerated insulin response during an intravenous glucose tolerance test.[15,16] This insulin resistance is associated with a decreased glucose clearance (impaired glucose tolerance), which indicates a prediabetic state.

Untreated hyperthyroid cats sometimes develop overt diabetes mellitus.[17,18] Many of these diabetic cats develop moderate resistance to the injected insulin, with poor diabetic control.[17,19] However, the insulin resistance and prediabetic state that is so