




THERAPEUTIC APPROACH AND CLINICAL MANAGEMENT IN THE TREATMENT OF FELINE HYPERTHYROIDISM

ABORDAGEM TERAPÊUTICA E MANEJO CLÍNICO NO TRATAMENTO DO HIPERTIREOIDISMO FELINO

ABORDAJE TERAPÉUTICO Y MANEJO CLÍNICO EN EL TRATAMIENTO DEL HIPERTIROIDISMO FELINO

 <https://doi.org/10.56238/isevmjv5n3-003>

Receipt of originals: 04/22/2026

Acceptance for publication: 05/22/2026

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ABSTRACT

Feline hyperthyroidism is the most common endocrinopathy in elderly cats, resulting from the excessive production of thyroid hormones mainly due to adenomatous hyperplasia or functional adenomas of the thyroid gland. The disease causes significant multisystemic alterations, including cardiovascular, metabolic, and renal repercussions, and is frequently associated with the coexistence of Chronic Kidney Disease (CKD). The objective of this narrative literature review was to examine the main therapeutic approaches and clinical management strategies for the treatment of feline hyperthyroidism. Data collection was carried out in PubMed using descriptors related to the disease and its treatment in felines. The therapeutic modalities highlighted include radioactive iodine, antithyroid drug therapy with thioureylenes compounds, surgical thyroidectomy, and iodine-restricted diets, each with specific indications and limitations. Continuous clinical follow-up is essential due to the risk of renal decompensation, iatrogenic hypothyroidism, and systemic arterial hypertension after treatment. It is concluded that therapeutic success requires an individualized approach and periodic monitoring of renal and thyroid functions to ensure quality of life and survival in feline patients.

Keywords: Feline Hyperthyroidism. Elderly Cats. Chronic Kidney Disease. Radioactive Iodine. Thioureylenes Compounds. Clinical Management.

RESUMO

O hipertireoidismo felino é a endocrinopatia mais frequente em gatos idosos, resultando da produção excessiva de hormônios tireoidianos devido, principalmente, à hiperplasia adenomatosa ou adenomas funcionais da glândula tireoide. A enfermidade causa alterações multissistêmicas importantes (incluindo repercussões cardiovasculares, metabólicas e renais) e está frequentemente associada à coexistência da Doença Renal Crônica (DRC). O objetivo desta revisão bibliográfica narrativa foi examinar as principais abordagens terapêuticas e estratégias de manejo clínico para o tratamento do hipertireoidismo felino. O levantamento de dados foi realizado no PubMed, utilizando

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descritores relacionados à enfermidade e ao tratamento em felinos. As modalidades terapêuticas destacadas incluem o iodo radioativo, a terapia medicamentosa com tioureileno, a tireoidectomia cirúrgica e a dieta com restrição de iodo, cada uma com indicações e limitações específicas. O acompanhamento clínico contínuo é indispensável devido ao risco de descompensações renais, hipotireoidismo iatrogênico e hipertensão arterial sistêmica após o tratamento. Conclui-se que o sucesso terapêutico requer uma abordagem individualizada e o monitoramento periódico das funções renal e tireoidiana para garantir a qualidade de vida e a sobrevida dos pacientes felinos.

Palavras-chave: Hipertireoidismo Felino. Gatos Idosos. Doença Renal Crônica. Iodo Radioativo. Tioureileno. Manejo Clínico.

RESUMEN

El hipertiroidismo felino es la endocrinopatía más frecuente en gatos geriátricos, resultante de la producción excesiva de hormonas tiroideas debido principalmente a la hiperplasia adenomatosa o a adenomas funcionales de la glándula tiroides. La enfermedad provoca importantes alteraciones multisistémicas, incluidas repercusiones cardiovasculares, metabólicas y renales, y con frecuencia se asocia con la coexistencia de la Enfermedad Renal Crónica (ERC). El objetivo de esta revisión bibliográfica narrativa fue examinar los principales enfoques terapéuticos y estrategias de manejo clínico para el tratamiento del hipertiroidismo felino. La recopilación de datos se realizó en PubMed utilizando descriptores relacionados con la enfermedad y su tratamiento en felinos. Las modalidades terapéuticas destacadas incluyen el yodo radiactivo, la terapia farmacológica con compuestos tioureilénicos, la tireoidectomía quirúrgica y la dieta con restricción de yodo, cada una con indicaciones y limitaciones específicas. El seguimiento clínico continuo es indispensable debido al riesgo de descompensación renal, hipotireoidismo iatrogénico e hipertensión arterial sistémica después del tratamiento. Se concluye que el éxito terapéutico requiere un enfoque individualizado y el monitoreo periódico de las funciones renal y tiroidea para garantizar la calidad de vida y la supervivencia de los pacientes felinos.

Palabras clave: Hipertiroidismo Felino. Gatos Geriátricos. Enfermedad Renal Crónica. Yodo Radiactivo. Compuestos Tioureilénicos. Manejo Clínico.



1 INTRODUCTION

Feline hyperthyroidism is a multisystem disorder resulting from the excessive production and secretion of the hormones thyroxine (T4) and triiodothyronine (T3) by the thyroid gland. First described in the late 1970s, the condition has evolved from a rare pathology to become the most common endocrinopathy in middle-aged to elderly domestic cats worldwide. It is estimated that more than 10% of senior cats (over 10 years old) develop the disease. In more than 95% of clinical cases, the etiology is associated with benign changes, such as adenomatous hyperplasia or functional adenomas in one or both thyroid lobes, while thyroid carcinoma accounts for less than 5% of occurrences (Carney et al., 2016; Malik and Charlton, 2002).

The exact pathogenesis remains uncertain, but it is believed to be multifactorial, involving genetic, environmental, and nutritional factors. Long-term exposures to dietary buccogens, such as soy isoflavones, and to environmental endocrine disruptors, such as bisphenol A (BPA) present in can coatings and polybrominated ethers (PBDEs) in house dust, have been pointed out as possible triggers for autonomic follicular cell proliferation (Yu et al., 2022; Geddes and Aguiar, 2022). Clinically, the disease is manifested by a hypermetabolic state characterized by weight loss, polyphagia, polydipsia, polyuria, and behavioral changes, such as hyperactivity and excessive vocalization. Clinical management is challenging due to the frequent coexistence of comorbidities, such as chronic kidney disease (CKD) and heart disease, which can be masked by thyrotoxic status. The objective of this article is to review current therapeutic approaches and management protocols to optimize the quality of life and longevity of feline patients (Geddes and Aguiar, 2022; Peterson, 2012).

2 METHODOLOGY

The present research is configured as a narrative literature review, structured with the aim of condensing and examining contemporary scientific evidence about the therapeutic approach and clinical management in the treatment of feline hyperthyroidism. Data collection was carried out by consulting the PubMed database, using the search terms "Hyperthyroidism; Cats", articulated via logical operators AND and OR, following the terminological pattern of Medical Subject Headings (MeSH). The selection included works published in the last twenty-five years, with access to the full text and written in Portuguese or English, which had direct adherence to the theme. Studies with no



pertinent relationship to the central focus, duplicate publications, narrative reviews with marked methodological limitations, and documents not indexed on the aforementioned platform were disregarded. The selection process was carried out in two stages: preliminary screening of titles and abstracts, followed by full analytical reading to ratify relevance. The information collected was systematized under a descriptive approach.

3 RESULTS AND DISCUSSION

3.1 DIAGNOSIS AND CLINICAL CATEGORIZATION

Diagnosis is based on a combination of historical findings, physical examination, and specific laboratory tests. Palpation of thyroid nodules (goiter) is a common finding, although small nodules may be found in euthyroid cats. The first-line laboratory test is the serum total T4 concentration (TST4), which has high specificity. However, in cases of clinical suspicion with normal TST4, the use of free T4 by balance dialysis (fT4ed) offers greater sensitivity, but lower specificity, and may be elevated due to nonthyroid diseases (NCDs). The 2016 AAFP guideline establishes six groups of diagnostic categories, from classic cases to clinically normal cats with altered laboratory results, guiding immediate monitoring or intervention according to each profile (Carney et al., 2016; Geddes and Aguiar, 2022)..

3.2 THERAPEUTIC MODALITIES

There are four main treatment options, each with specific advantages and disadvantages:

1. **Radioactive Iodine (I-131):** It is widely considered the treatment of choice because it is curative and non-invasive. Selectively destroys overactive tissue without affecting normal or parathyroid tissues. Administration can be subcutaneous or oral (the latter common in certain regions due to the cost and availability of capsules). It has a success rate of over 95%, but requires hospital isolation for radiological safety reasons (Yu et al., 2022).
2. **Medical Therapy (Thioureylenes):** The use of methimazole or carbimazole inhibits the synthesis of thyroid hormones by blocking the thyroid enzyme peroxidase. It is a reversible option, ideal for pre-surgical stabilization or renal impact assessment. Side effects occur in up to 25% of cats and include gastrointestinal disturbances, lethargy, facial itching, and blood dyscrasias



(Carney et al., 2016; Geddes and Aguiar, 2022).

3. **Surgical Thyroidectomy:** A potentially curative procedure, but one that requires surgical experience to prevent damage to the parathyroid glands, which would result in severe hypocalcemia. Preoperative scintigraphy is recommended to identify ectopic tissue that would not be removed in cervical surgery (Carney et al., 2016).
4. **Dietary Therapy:** The use of diets with strictly limited iodine (0.2 ppm) can normalize the 4TT in up to 83% of cats within 60 days. The diet should be exclusive and permanent, with the main limitation being the lack of palatability for some patients and the difficulty in homes with multiple cats (Carney et al., 2016).

3.3 MANAGEMENT OF COMORBIDITIES AND HEMODYNAMIC EFFECTS

Hyperthyroidism increases cardiac output and glomerular filtration rate (GFR), which often masks an underlying CKD by artificially reducing serum creatinine. With treatment, the drop in GFR can "unmask" azotemia in 15% to 49% of cases. The development of iatrogenic hypothyroidism post-treatment is a critical complication, as excessive reduction of thyroid hormones further impairs kidney function and is associated with shorter survival times in azotemic cats. In these cases, supplementation with levothyroxine is recommended (Hiebert et al., 2020).

Additionally, hyperthyroid cats have been observed to have significantly higher automated platelet counts compared to healthy cats, although platelet function itself does not appear to undergo measurable changes under high shear conditions. Monitoring systolic blood pressure is indispensable, given that secondary hypertension is prevalent and may persist or even emerge after restoration of the euthyroidian state (Geddes and Aguiar, 2022; Yu et al., 2022).

4 CONCLUSION

Feline hyperthyroidism, the most prevalent endocrinopathy in elderly cats, requires a complex and individualized therapeutic approach, as evidenced in this review. The condition, often resulting from benign changes in the thyroid gland, promotes a hypermetabolic state that generates multisystem repercussions, with the coexistence of CKD being the main management complication (Hiebert et al., 2020).

Four treatment modalities are available: Radioactive Iodine ($I-131$) is the curative



method of choice, with a high success rate, but requires hospital isolation. Thioureylene drug therapy, such as methimazole, is ideal for stabilization and testing of kidney function, but it is reversible and can cause side effects. Surgical thyroidectomy is potentially curative, but requires care to prevent damage to the parathyroid glands. Finally, the iodine-restricted diet is an effective alternative, depending on the strict adherence of the patient and the owners (Geddes and Aguiar, 2022; Yu et al., 2022).

Long-term success is critically dependent on the management of comorbidities, especially since reducing thyroid hormones can "unmask" a preexisting azotemia due to falling GFR. The development of iatrogenic hypothyroidism is another serious complication associated with shorter survival in azotemic cats, necessitating levothyroxine supplementation when it occurs. Continuous monitoring of systolic blood pressure is essential, given the risk of secondary hypertension. Therefore, the therapeutic choice must be made on an individual basis and periodic monitoring of renal and thyroid functions is essential to ensure the best quality of life and longevity of feline patients (Geddes and Aguiar, 2022; Yu et al., 2022).

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