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Feline Hyperthyroidism: **Etiology, Clinical Aspects and Diagnosis**

Introduction

Feline hyperthyroidism is the most common endocrine disorder of middle-aged and older cats. It results from excessive production and release of thyroid hormones, which leads to a multisystemic clinical syndrome. If unrecognized, it may have significant consequences, particularly on the cardiovascular and renal systems.

Definition

Feline hyperthyroidism is a functional thyroid disorder caused by autonomous overproduction of thyroxine (T4) and triiodothyronine (T3), resulting in a chronic hypermetabolic state.

Etiology and Pathogenesis

Over 95% of feline hyperthyroidism cases are caused by benign adenomatous hyperplasia or thyroid adenoma, affecting one (about 30% of cases) or both lobes (about 70% of cases) of the thyroid gland. Thyroid carcinoma accounts for less than 5% of cases.

The exact pathogenesis is not fully understood, but several contributing factors have been proposed:

- Environmental exposures, particularly to endocrine-disrupting chemicals such as polybrominated diphenyl ethers (PBDEs), commonly found in dust, food packaging, and household products.
- Dietary factors, such as excessive or fluctuating iodine intake and the long-term consumption of canned food.
- Altered thyroid autoregulation, leading to loss of negative feedback mechanisms.
- Somatic mutations in thyroid follicular cells (e.g., in the TSH receptor or G-protein signaling pathways) may contribute to the development of autonomous function.

The disease is often bilateral but not necessarily symmetrical. The hyperfunctioning thyroid tissue escapes pituitary control and continues to produce excessive hormones regardless of low circulating TSH levels.

Signalment

Age: 95% of cats with hyperthyroidism are older than 9 years (average 12–13 years).
Sex: No significant sex predilection.
Breed: No definitive breed predisposition, but Siamese and Himalayan cats may have a lower incidence.

Clinical Features

The clinical presentation is typically dominated by signs of increased metabolic rate, although manifestations can be variable. Common clinical signs include:

- Weight loss despite a normal or increased appetite (92% of the cases)
- Polyphagia
- Hyperactivity, nervousness or restlessness
- Vomiting
- Diarrhea
- Polydipsia and polyuria
- Poor hair coat
- Aggression or behavioral changes

A small subset of cats may present with “apathetic hyperthyroidism,” showing lethargy and inappetence rather than hyperactivity.

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Physical Examination

Findings may include:

- **Palpable cervical mass** (enlarged thyroid lobe or "thyroid slip") **in >95% of the cases**
- Low body condition score
- Tachycardia (>220 bpm), arrhythmia, or systolic heart murmur
- Muscle wasting
- Dehydration.

Laboratory Findings

- Total T4 (tT4): Typically elevated and serves as the primary diagnostic test.
- Free T4 (fT4): More sensitive but less specific; useful in cats with strong clinical suspicion and normal tT4.
- CBC and serum biochemistry:
  - Mild erythrocytosis
  - Neutrophilia, lymphopenia
  - Elevated liver enzymes (especially ALT and ALP)
  - Azotemia and hyperphosphatemia (especially if concurrent CKD)
- TSH: Suppressed in almost all cases
- Urinalysis: May reveal hyposthenuria or isosthenuria.

Diagnostic Imaging

- Thyroid scintigraphy: Gold standard for assessing thyroid function and detecting bilateral, ectopic, or carcinoma-related disease.
- Ultrasound: Can help identify nodular thyroid changes, but is less reliable than scintigraphy for functional assessment.

Diagnosis

Diagnosis is based on a combination of clinical signs and biochemical testing.

1. Elevated total T4 (tT4) in a symptomatic cat is usually sufficient to confirm the diagnosis.
2. In cats with suggestive clinical signs but normal tT4, repeat testing after 1–2 weeks is recommended. The disease is often fluctuating, and a single normal tT4 does not exclude hyperthyroidism.
3. Free T4 (fT4) measured by equilibrium dialysis can be used in ambiguous cases. Its higher sensitivity helps detect early or mild cases, but its lower specificity may result in false positives (e.g., in sick euthyroid cats).
4. TSH (canine assay) may aid in equivocal cases: a TSH concentration that is not low or undetectable makes the presence of hyperthyroidism extremely unlikely.
5. Imaging (thyroid scintigraphy or ultrasound) is indicated in cases with discordant results or for treatment planning (e.g., confirming unilateral vs. bilateral disease).

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