

PREVALENCE OF AND RISK FACTORS FOR FELINE HYPERTHYROIDISM IN SOUTH AFRICA

McLean J.L.^{1,2}, Lobetti R.G.², Thompson P.N.³, Schoeman J.P.¹

¹Department of Companion Animal Clinical Studies, Faculty of Veterinary Science, University of Pretoria, Onderstepoort, South Africa, email: joanne@fuseprop.co.za,

²Bryanston Veterinary Hospital, Box 67092, Bryanston, South Africa, ³Department of Production Animal Studies, Faculty of Veterinary Science, University of Pretoria, Onderstepoort, South Africa

Introduction

Feline hyperthyroidism is an emerging metabolic disease of middle-aged to older cats that seems to have shown a marked increase in its world-wide prevalence within the last three decades. Epidemiological studies performed to date have also shown a marked geographic variation in the prevalence of the disease (Figure 1). Although clinical features of feline hyperthyroidism as well as its pathological lesions are well described, the exact pathogenesis of the disease still remains obscure and despite a plethora of epidemiological studies, clear risk factors for the disease have not been identified. As far as the authors are aware, no prevalence studies have been performed in South Africa, a geographic area in which hyperthyroidism in cats has only relatively recently been observed and reported and the prevalence of which subjectively appears to be on the increase. The purpose of this study was to determine the prevalence of feline hyperthyroidism in South Africa and to identify potential risk factors associated with the disease in this geographic location.

Materials and Methods

This analytical, cross-sectional study was conducted on cats that were presented at five general veterinary practices throughout South Africa. Cats were included in the study if they were 9 years of age or older and had resided solely in South Africa. Cats were excluded from the study if they presented in shock or were moribund, if their demeanour precluded the collection of a blood sample, if they were undergoing chemotherapy or if they had been treated with drugs that could potentially affect T₄ and TSH concentrations. At the time of blood sampling a questionnaire was completed regarding health status of the cat, vaccination history, internal and external parasite control, diet and environment.

Serum total T₄ (tT₄) and canine TSH (cTSH) concentrations was determined in all cats by use of a chemiluminescent competitive immunoassay (Immulite® 1000 Canine total T₄, Siemens Medical Solutions Diagnostics) and a chemiluminescent immunometric assay (Immulite® 1000 Canine TSH, Siemens Medical Solutions Diagnostics) respectively. Free T₄ (fT₄) concentrations was also measured in cats with a serum total T₄ concentration between 30-50 nmol/l and a serum cTSH concentration less than 0.03ng/ml using equilibrium dialysis. Cats with a serum tT₄ concentration greater than 50 nmol/l or cats with a serum tT₄ concentration between 30-50 nmol/l, a serum cTSH concentration less than 0.03ng/ml and a serum fT₄ concentration greater than 50pm/l were classified as hyperthyroid.

Prevalence of hyperthyroidism, with exact binomial 95% confidence intervals (CIs), was calculated for all cats combined, for cats classified as healthy and for those classified as sick. Prevalence was compared between healthy and sick cats using a two-tailed Fisher's exact test.

Univariable associations between potential risk factors and hyperthyroidism were assessed using a two-tailed Fisher's exact test. Thereafter, all predictors were entered into a multiple logistic regression model to estimate their effect on the risk of hyperthyroidism. Associations between clinical signs and hyperthyroidism were assessed on a univariable level using a two-tailed Fisher's exact test.

Results

The study population consisted of a total of 302 cats. The most common breeds represented included domestic shorthair (DSH) (n=201), domestic longhair (DLH) (n=29), Siamese and Siamese Crosses (n=26), Persian and Persian crosses (n=10), Burmese (n=10), Balinese (n=6) and Maine Coon and Maine Coon crosses (n=5). There were 161 females and 141 males, 265 of which were neutered. The median age of the cats was 12 years (range 9-24 years).

Twenty-one cats were diagnosed as being hyperthyroid. **The prevalence of hyperthyroidism within the study population was 7% with no significant difference in prevalence between healthy and sick cats (Table 1, Figure 1).** Although there were more female cats (8.1%) with hyperthyroidism than male cats (5.7%), the difference was not statistically significant. Likewise, there were more non-purebred cats (7.5%) with hyperthyroidism than purebred cats (4.9%) as well as a lower proportion of Siamese and Siamese-cross cats with hyperthyroidism (4.8%) compared to all other breeds (7.1%). The differences, however, were again not statistically significant. No statistically significant relationship between vaccinations, parasite control or indoor environment and hyperthyroidism was observed.

Only age and the presence of canned food in the diet were retained in the final logistic regression model of risk factors. **Cats ≥ 12years of age and cats with canned food in their diet were more likely to be diagnosed with hyperthyroidism (Table 2).**

Weight loss and tachycardia were the most common clinical findings in the hyperthyroid cats, followed by vomiting, tachypnoea and polyphagia. Only two of the affected cats had a palpable thyroid lobe. Univariable analysis for these clinical signs as predictors of hyperthyroidism demonstrated that hyperthyroid cats were more likely to present with weight loss (OR= 3.2 [95% CI: 1.2, 8.9], p= 0.01) and with a heart rate ≥ 200bpm (OR= 5 [95% CI: 1.7, 16.1], p= 0.01) than cats without the disease.

Conclusions

Feline hyperthyroidism appears to be a more common disease in older cats presenting to private veterinary clinics in South Africa than previously thought. Typical clinical signs associated with hyperthyroidism such as weight loss, voracious appetite and palpable goitre do not appear to be clinical features of the early disease in South African cats. Hyperthyroidism needs to be considered in any older cat demonstrating weight loss or tachycardia (HR ≥ 200) in this cat population. Risk factors for feline hyperthyroidism, previously found in other epidemiological studies, specifically older age and the presence of canned food in the diet also appear to be present in this study population.

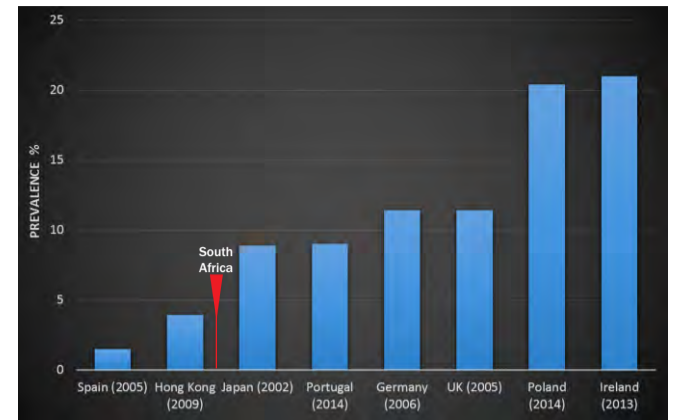


Figure 1. Prevalence of feline hyperthyroidism recorded in different countries based on different inclusion/exclusion criteria

Table 1. Prevalence of hyperthyroidism in 302 cats presented to veterinary clinics in South Africa

	Number of cats	Prevalence (%)	95% CI
Sick cats	15/184	8.1	4.6- 13.1
Healthy cats	6/118	5.1	1.9- 10.7
Total	21/302	7.0	4.4- 10.4

Table 2. Final logistic regression model of risk factors for hyperthyroidism in cats 9 years and older presented to veterinary clinics in South Africa

Variable	Category	OR	95% CI	P
Age	<12 years*	1.00	-	-
	≥12years	4.31	1.24-15.12	0.02
Canned food in diet	No*	1.00	-	-
	Yes	2.10	0.822-5.36	0.1

*Reference category

