
Introduction: Hyperthyroidism is diagnosed based on clinical signs and elevated serum total thyroxine (TT$_4$) levels. Imaging diagnosis is made with nuclear scintigraphy, and recently non-contrast computed tomography (CT) has been shown to be a reliable alternative in anesthetized hyperthyroid cats. Our goals were to establish a CT thyroid imaging protocol in awake cats, compare the thyroid gland CT appearance of euthyroid cats to hyperthyroid cats pre- and post-methimazole, and determine whether thyroid size or attenuation pre-treatment correlated with methimazole dose.

Methods: Six hyperthyroid cats received CT pre- and post-methimazole treatment (at least 30 days after normal TT$_4$ level), and were compared to seven euthyroid cats. Hyperthyroid cats were imaged awake in a Mousetrap® restraint device or cat carrier. CT imaging characteristics measured included size (maximum length, width, and height), shape, location and attenuation.

Results: Thyroid volume was significantly larger in pre-methimazole (mean = 76.35mm) and post-methimazole hyperthyroid cats (mean = 66.12mm) compared to euthyroid cats (mean = 19.4mm; p = 0.005, p = 0.03, respectively). Methimazole treatment significantly lowered attenuation (mean = 81.11 HU) compared to pre-methimazole hyperthyroid (mean = 91.53 HU; p = 0.03) and euthyroid cats (mean = 97.01 HU; p = 0.03). Dose of methimazole ranged from 2.5 mg to 7.5 mg daily. There was no significant correlation between thyroid size, attenuation and methimazole dose.

Conclusion: Euthyroid and hyperthyroid cats are easily imaged awake with CT. Methimazole significantly lowers thyroid attenuation but not size in hyperthyroid cats. Pre-treatment CT does not predict methimazole dose in hyperthyroid cats.