WHEN can I check for...?

Sandra Forsyth, Clinical Pathologist for SVS Laboratories, offers some recommendations on when you should take samples in relation to medications.

A QUESTION THAT veterinarians commonly ask staff at diagnostic laboratories is, "When do I take a sample in relation to a particular medication?" The following are recommendations for some of the more common situations.

MONITORING THYROID FUNCTION

Hyperthyroid cats

In cats on antithyroid treatments (including prescription diets), serum T_4 is usually assessed 10–20 days after starting therapy or adjusting the dosage, then at three- to six-month intervals once the cats are stable.

In hyperthyroid cats there is no significant relationship between T_4 and dosing interval or post-pill times in a 24-hour period. Consequently, the timing of a blood test is not important if the cat is consistently receiving medication. T_4 can return to pre-treatment values within 48 hours of stopping medication.

T_4 is not the only parameter that should be monitored in cats on antithyroid medication. Adverse reactions occur in about 20% of cats receiving methimazole/carbimazole, and are usually seen in the first three months of treatment. Mild changes in the complete blood count may be seen and a small proportion of cats (less than 5%) may develop severe leukopenia or thrombocytopenia.

Recommendations for monitoring T_4 levels in cats after radioactive iodine (I-131) are usually offered by the treatment providers, but in general levels are monitored at one, three, six and 12 months post-treatment and then every six to 12 months thereafter.

The glomerular filtration rate falls during treatment for hyperthyroidism and this can unmask renal dysfunction, with about 30% of cats developing chronic kidney disease as their hyperthyroidism is controlled. Baseline urine-specific gravity of less than 1.035 was found to be the most sensitive (90.9%) marker for predicting post-treatment I-131 azotaemia, whereas baseline creatine (>140umol/L) was most specific (DeMonaco et al., 2020). It is probably similar for cats on oral medications.

Moderate to severe non-thyroidal illness can suppress total T_4 concentration in normal, hyperthyroid and treated cats, and this should be kept in mind when interpreting results.

Hypothyroid dogs

The best method for monitoring thyroid hormone replacement therapy in hypothyroid dogs is uncertain. There are considerable day-to-day variations in peak (four- to six-hour post-pill) serum T_4 concentration, and altering a patient's thyroid medication based on a single result should be done carefully and in conjunction with the clinical response to the medication.

Therapeutic monitoring is usually carried out two to three weeks after starting or adjusting the thyroid medication, and then at six- to 12-monthly intervals. A serum sample for T_4 is taken four to six hours after starting or adjusting medication.

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THE EFFECT OF GLUCOCORTICOIDS ON TOTAL T_4

Glucocorticoids can reduce serum T_4 concentration. A single dose of short-acting glucocorticoid produces no significant change in T_4 concentration. However, long-term treatment can have a significant effect and glucocorticoid should be stopped for at least four weeks, and preferably six to eight weeks, before testing thyroid function. Similarly, dogs with hyperadrenocorticism frequently show suppressed T_4 concentrations.

MONITORING ADRENAL FUNCTION

Hyperadrenocorticoid dogs

When trilostane was first introduced, adrenocorticotropic hormone (ACTH) stimulation became the default test for monitoring the treatment response as a hangover from mitotane monitoring. However, the use of ACTH stimulation for monitoring trilostane efficacy has not been supported by studies, which show that clinical control is only loosely related to cortisol concentration following adrenal stimulation. One study found that pre-trilostane cortisol concentrations deliver as good an estimate of adrenal control, providing that the dog was clinically well controlled and was not showing signs of illness or hypoadrenocorticism at the time of testing (Macfarlane et al., 2016).

A serum sample taken zero to one hour before the next trilostane dose provided evidence of good control when the cortisol concentration was 40–138nmol/L (variations in analysis methods mean that reference intervals will differ between laboratories). Stressed and excited dogs may show higher cortisol concentrations (Boretti et al., 2018). ACTH stimulation remains the test of choice in dogs who show poor control or signs of illness.

After starting trilostane, it is recommended that the patient be checked at two weeks to confirm overdosage hasn't occurred. In many dogs the serum cortisol concentration continues to fall over the ensuing weeks without an increase in dose. Cortisol is rechecked in another two to four weeks then at three-monthly intervals.

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Hypoadrenocorticoid dogs

While not fitting with the 'when do I test?' theme, the difficulty in obtaining ACTH (Synacthen) raises the question of alternative tests for the diagnosis of a suspect hypoadrenocorticoid dog. The urinary cortisol-creatinine ratio (UCCR) has been found to have a high sensitivity and specificity to detect hypoadrenocorticism when the UCCR is less than three (Rowland et al., 2018). However, other authors have found UCCR may be less than three in urine samples collected at home, but generally not in samples collected at the clinic (Citron et al., 2020).

THE EFFECT OF GLUCOCORTICOIDS ON SKIN BIOPSIES

Glucocorticoids should be stopped at least two and preferably four weeks before biopsying skin lesions.

WITHDRAWAL TIMES IN ANIMALS ON ANTIBIOTICS

Ears

When culturing ear swabs, a three-day withdrawal from topical medications is usually sufficient, although if bacteria are seen on cytology despite treatment, culturing could be done immediately.

Skin

If there is no response to antibiotic therapy, immediate culture would theoretically be acceptable. However, 48 hours without medication prior to culturing is recommended.

Urine

When culturing urine, about five elimination half-lives of the drug should pass before a sample is taken. This is about three to five days when the antibiotic is administered two or three times per day, and five to seven days for once-a-day medication. VS

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