# Hormone troubles

By Rebecca Allan

## Addison's disease in dogs: typical or atypical?

Diagnosing hypoadrenocorticism, or Addison's disease, can be challenging due to the wide variety of clinical presentations, which can range from acute to vague and non-specific. There are often significant overlaps in clinical signs and laboratory results that may relate to various underlying conditions. Furthermore, the lack of hallmark electrolyte abnormalities during the initial diagnosis doesn't necessarily imply atypical hypoadrenocorticism.

Hypoadrenocorticism is an uncommon endocrinopathy in dogs that occurs when there is destruction or atrophy of layers of the adrenal cortex (Hauck et al., 2020). In the most common form, both the zona glomerulosa (the outer layer, which makes mineralocorticoids) and the zona fasciculata (the middle layer, which makes glucocorticoids) are affected, leading to glucocorticoid and mineralocorticoid-deficient hypoadrenocorticism. In up to 30% of cases, however, only the zona fasciculata is affected, leading to glucocorticoid deficient hypoadrenocorticism, also known as atypical hypoadrenocorticism (Scott-Moncrief, 2015).

The ensuing glucocorticoid and/or aldosterone deficiencies lead to clinical signs that are frequently vague, episodic and non-specific, including lethargy, anorexia, vomiting, weight loss and diarrhoea, but they can also be acute in onset, with patients presenting recumbent and in acute circulatory collapse (Hauck et al. 2020; Scott-Moncrief, 2015).

Laboratory findings can be similarly non-specific. Commonly seen are hyperkalaemia, hyponatremia and the lack of a stress leucogram (lymphocyte concentration in the normal range), but azotemia, hypochloraemia, hypercalcaemia, hypocholesterolaemia, hypoalbuminemia and a mild non-regenerative anaemia can also be present (Scott-Moncrief, 2015).

### A challenging case

A case submitted to Awanui Veterinary highlighted the challenges in differentiating hypoadrenocorticism with both glucocorticoid and mineralocorticoid deficiency from that with just glucocorticoid deficiency, ie, atypical hypoadrenocorticism.

The patient, a one-year-old entire female Kelpie, was taken by her owners to the veterinarian in a collapsed and non-responsive state with haemorrhagic gastroenteritis. Initial in-clinic laboratory results revealed mild azotaemia, marginal hyponatraemia, marked panhypoproteinaemia and hypocholesterolaemia, a normal potassium concentration, unremarkable CBC and normal lymphocyte concentration.

After the initiation of supportive treatment and in consultation with an internal medicine specialist, atypical Addison's disease was suspected. An ACTH (adrenocorticotropic hormone) stimulation test was performed, and basal and one-hour post-ACTH stimulation serum cortisol concentrations were both <4.01nmol/L, fulfilling the diagnostic criteria for hypoadrenocorticism – which are that both pre- and post-ACTH cortisol concentrations are <55nmol/L (Scott-Moncrief, 2015).

With mild hyponatremia attributed to gastrointestinal losses, and with the potassium concentration in the normal range, a presumptive diagnosis of atypical hypoadrenocorticism was made. The patient responded well to prednisone therapy; however, at a two-week check-up the owner mentioned she seemed lethargic and tired easily. Repeat serum biochemistry at this time revealed hyperkalemia (6.4mmol/L; reference range 4.0-5.4mmol/L), hyponatremia (135mmol/L; reference range 141–153mmol/L) and hypochloremia (85mmol/L; reference range 104–123mmol/L), electrolyte abnormalities consistent with mineralocorticoid deficiency. These results indicated a progression to typical hypoadrenocorticism, and mineralocorticoid replacement therapy was initiated (Florinef®).

### Discussion

As highlighted in this case, the development of electrolyte abnormalities can occur after an initial diagnosis of atypical



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hypoadrenocorticism. This is proposed to be due to a disparity in the rate of destruction of glucocorticoid and mineralocorticoid secreting cells in the adrenal gland, which is at first limited to the zona fasciculata then spreads to the zona glomerulosa (Scott-Moncrief, 2015).

While the very mild hyponatremia in this case was put down to gastrointestinal loss, it's interesting that mild hyponatremia is reported to occur due to glucocorticoid deficiency alone (Scott-Moncrief, 2015). The glucocorticoid deficiency leads to a failure to affect renal free water clearance, with the development of water retention and dilutional hyponatraemia (Garrahy and Thompson, 2018).

In summary, this case underscores the need for careful monitoring after an initial diagnosis of atypical hypoadrenocorticism, given the potential for disease progression and the risk of mineralocorticoid deficiency leading to electrolyte imbalances. VS

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