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Guidelines for the treatment of acute hypoadrenocorticism (Adrenal crisis)

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Intravenous fluids

- The degree of dehydration should be assessed from the history and clinical examination
- In general 0.9% saline is the preferred choice but the rate and volume of fluid administration are more important factors in successful therapy
- Most dogs with acute severe hypoadrenocorticism will be at least 10% dehydrated. In such circumstances considerable volumes of fluids will have to be administered (100 - 150 ml/kg over the first 24 hours)
- The best method of preloading is unknown but most authors recommend the principle of preloading. If preloading is undertaken (e.g. with 'shock rate' fluids) then it is important to continue fluid administration afterwards

Treatment of hyperkalaemia

- It is not necessary to specifically treat mild hyperkalaemia that is clinically silent
- In the vast majority of cases of hyperkalaemia, potassium concentrations will respond to fluid therapy as outlined above sufficiently rapidly
- Potassium concentrations should be monitored every 6 hours in severe cases (more than 8 mmol/l) and every 24 hours in other cases
- Continuous ECG monitoring is advisable in severe cases. However ECG findings do not always correlate with clinical severity of hyperkalaemia and may, in rare cases, even be normal in the face of life threatening hyperkalaemia
- Calcium therapy has been advocated for cases of severe bradycardia. Providing serum calcium concentrations are normal then calcium can be administered slowly. However there are no reliable case reports where this has been found to be necessary. Insulin / glucose therapy to treat hyperkalaemia is not recommended as the risk of developing hypoglycaemic seizures is probably increased in cases of hypoadrenocorticism

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Treatment of hyponatraemia

- It is not necessary to specifically treat mild hyponatraemia that is clinically silent
- In the vast majority of cases of hyponatraemia, sodium concentrations will respond to fluid therapy as outlined above
- In severe hyponatraemia (less than 120 mmol/l) then rapid correction may lead to central pontine myelinolysis, which is the destruction of the myelin sheath covering nerve cells in the middle of the brainstem leading to brain oedema
- Sodium concentrations should be corrected at a rate not faster than 1 mmol/hr in acute cases or 0.5 mmol/hr in chronic cases
- In severe cases low sodium-containing fluids (e.g. 0.45% NaCl) should be used initially (ideally use a fluid with a sodium concentration of 10 mmol/l above the current plasma sodium concentration). Mineralocorticoid replacement should be reduced or postponed to reduce the risk of excessively rapid increases in sodium
- Sodium concentrations should be monitored every 6 hours in severe cases and every 24 hours in other cases

Glucocorticoid treatment

- An initial dose (see table 1) of intravenous glucocorticoids that is about 3 times maintenance is indicated in all cases of hypoadrenocorticism
- There is no evidence to support the use of high doses (so-called 'shock' doses) as they could contribute to GI haemorrhage without adding benefit
- Prednisolone is the ideal glucocorticoid for maintenance therapy and is required in all dogs treated with Zycortal®. Minimum doses should be established for each patient
- Strategic dosing (double normal dose) at times of metabolic stress (e.g. surgical procedures) is advised
- Overdosing is relatively common in the longer term. Patients should be observed for signs of polyuria/polydipsia, alopecia, weight gain and other signs of iatrogenic hypercortisolism



Table 1. Glucocorticoids for emergency treatment of hypoadrenocorticism

Glucocorticoid	Dose rate	Route of administration
Hydrocortisone sodium succinate ¹	0.5 mg/kg/hour ¹	Intravenous infusion
Methylprednisolone sodium succinate	1 mg/kg	Intravenous bolus
Dexamethasone sodium phosphate ²	0.2 mg/kg	Intravenous bolus

¹ Also available as hydrocortisone sodium phosphate

² Some preparations are not licensed for intravenous use in dogs. Do not confuse with longer acting preparations that contain suspensions of other esters



Mineralocorticoid treatment

- There are no intravenous formulations of pure mineralocorticoid but hydrocortisone does have some weak mineralocorticoid properties
- Hypovolaemia, dehydration, pre-renal azotaemia and inadequate tissue perfusion must be corrected with intravenous fluid therapy before starting treatment with Zycortal. The initial dose is 2.2 mg/kg body weight, administered by subcutaneous injection

Correction of acidosis

- Many dogs with acute severe hypoadrenocorticism are acidotic
- Correction of fluid deficits will normally restore acid-base balance and should always be started before any specific treatment of acidosis is attempted
- Sodium bicarbonate therapy requires a working knowledge of blood gas analysis and rapid access to a blood gas analyser
- Therapy should only be considered if blood pH is less than 7.2
- Sodium bicarbonate therapy is not without its risks which include cerebral oedema and death
- If in doubt it is better to concentrate on all of the above than to risk making the animal worse



Further reading and information

- Davis, H *et al* (2013) AAHA/AAFP Fluid Therapy Guidelines for Dogs and Cats, www.aaha.org

ZYCORTAL: Zycortal contains desoxycortone pivalate

Dechra Veterinary Products A/S, Mekuvej 9, 7171 Uldum, Denmark

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