



Case Report
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Signalment:

“Spike”

10 years old MN Miniature Pinscher
BCS 6/9

History

Spike initially presented to the VMSG Emergency Service for progressive lethargy and inappetence. He was treated for hypovolemic shock, electrolyte imbalance (severe hyponatremia, hypochloridemia, and hyperkalemia), azotemia and persistent polycythemia. At that time, hypoadrenocorticism was suspected; however, resting serum cortisol was within normal limits (4.7 ug/dL, ref range 1.0-6.0 ug/dL). His electrolytes normalized within two days, and all other tests (abdominal ultrasound, thoracic radiographs, bone marrow aspiration cytology) showed no significant abnormalities. Spike subsequently returned to VMSG within a couple days, for recurrent inappetence, nausea, shivering, and general malaise. Serum electrolytes were normal. The owners declined upper GI endoscopy with biopsy and elected to pursue trial glucocorticoid (dexamethasone injection) therapy to which he responded to very rapidly. Based on this response, despite the previously normal serum cortisol, basal serum aldosterone level was measured and was low (0 pmol/L, ref range 14-957 pmol/L). While awaiting these results, Spike was prescribed tapering oral prednisone therapy which he did well with until he presented with similar signs and electrolyte abnormalities (sodium 134 and potassium 7.0) and azotemia (BUN 107). Aldosterone ACTH stimulation test was then performed and confirmed suspected hypoadrenocorticism (post ACTH aldosterone 0 pmol/L, ref range 197-2103 pmol/L).

Etiology:

Hypoadrenocorticism (Addison’s disease) is a syndrome that results from deficient secretion of glucocorticoids (cortisol) and/or mineralocorticoids (aldosterone) by the adrenal cortex. Primary hypoadrenocorticism occurs when there is immune-mediated destruction of the adrenal cortex leading to a deficiency of all adrenocortical hormones. Granulomatous diseases, hemorrhagic infarctions, neoplasia are other possible but rare causes of primary hypoadrenocorticism. Secondary hypoadrenocorticism is associated with an abnormal hypothalamic-pituitary axis that reduces secretion of ACTH, causing atrophy of the adrenal cortices and impaired secretion of glucocorticoids. Mineralocorticoids usually remain adequate since ACTH only has minor effects on mineralocorticoid production.

Clinical Signs:

Clinical signs of hypoadrenocorticism are associated with deficiency in aldosterone and cortisol. These are usually nonspecific signs including dehydration, anorexia, lethargy and weakness, vomiting/regurgitation, diarrhea (hematochezia and melena are common), and weight loss. Patients may present in varying clinical severity from hypovolemic shock (Addisonian crisis) to a waxing and waning history of recurrent illness.

Diagnosis:

Diagnosis of primary hypoadrenocorticism is based on clinical signs, CBC/chemistry/urinalysis findings, and confirmation with a subnormal ACTH stimulation test (pre- and post-ACTH cortisol). Addisonian laboratory abnormalities are nonspecific and often attributed to other disease processes. The lack of a stress leukogram and anemia on CBC, hypercalcemia, azotemia, hypoglycemia, hypoalbuminemia, hypocholesterolemia, and mild elevation in liver enzymes on chemistry panel are all common and are due to glucocorticoid deficiency. Hyponatremia (<135 mEq/L) and hyperkalemia (>5.5 mEq/L) are the classic electrolyte disturbances and are due to mineralocorticoid deficiency. A reduced sodium: potassium ratio (<25:1) raises the index of suspicion for hypoadrenocorticism. Resting serum cortisol is the typical screening test for hypoadrenocorticism. However, Spike had a normal resting cortisol with a low basal serum aldosterone concentration. This is unusual since 95% of Addisonians are deficient in cortisol and aldosterone concurrently. The remaining 5% are cortisol-deficient and may or may not become aldosterone-deficient. The ACTH stimulation test (measuring pre- and post-ACTH cortisol) is the gold standard test for the definitive diagnosis of hypoadrenocorticism. Approximately 85% of dogs with hypoadrenocorticism have basal and post-ACTH cortisol concentrations of <1.0ug/dL and more than 90% have cortisol concentrations <2.0ug/dL. Very rarely, ACTH stimulation cortisol levels are not abnormally low, but serum aldosterone levels are, as demonstrated in Spike.

Treatment/Management:

Initial goals of treating an Addisonian in crisis are treating for hypovolemic shock and correcting electrolyte imbalances. Dexamethasone SP (0.5-1.0mg/kg IV) is the glucocorticoid supplementation of choice during resuscitation since it does not cross-react with cortisol in the ACTH stimulation test. Mineralocorticoid therapy is not essential during the immediate treatment of an Addisonian crisis but often facilitates in a more rapid recovery and is not considered harmful (if the patient ultimately is not Addisonian). Therefore, administration of desoxycorticosterone pivalate (DOCP, 2.2mg/kg IM) is recommended after ACTH stimulation test has been performed.

The maintenance therapy of hypoadrenocorticism involves lifelong supplementation of mineralocorticoids and glucocorticoids. DOCP 2.2mg/kg IM/SQ every 21-25 days is most commonly recommended. Electrolytes should initially be rechecked 2 weeks after initial treatment to evaluate adequate dosing, then at day 23 to assess appropriate dosing interval. Glucocorticoid supplementation is generally provided by prednisone /prednisolone at 0.25mg/kg PO daily then tapered to the lowest dose without adverse clinical effects for maintenance. Glucocorticoid dosage should be increased in anticipation of stressful events (e.g. anesthesia, surgery, boarding, strenuous activities). Alternatively, fludrocortisone acetate (Florinef) is an oral mineralocorticoid that requires twice daily dosing and has some glucocorticoid properties (making it less ideal for some patients who become Cushingoid while taking this drug at the doses needed to maintain normal electrolytes). Additional glucocorticoid therapy is often not needed while taking oral Florinef therapy.

Prognosis:

The prognosis for hypoadrenocorticism is excellent with appropriate maintenance therapy and good owner education/compliance. The owner should be made aware of the importance of a precise DOCP schedule, periodic electrolyte rechecks (every 3 to 6 months), and vigilance against Addisonian crises.

Follow-up:

Spike received DOCP 2.2mg/kg IM as initial dose. On his 2-week recheck post-DOCP injection, the owner reported that he had been doing well, and he had normal electrolytes indicating that his DOCP dose was adequate. His prednisone was further tapered to 0.5mg/kg PO EOD. At the 23-day recheck, his electrolyte levels remained normal. His DOCP dose was maintained at 2.2mg/kg SQ every 25 days. Prednisone dose was changed to 0.2mg/kg PO once daily. Spike is doing well with these therapies.

References:

Ettlinger S.J., Feldman E.C. Textbook of Veterinary Internal Medicine, Sixth Edition. Elsevier Saunders. P. 1612-1622.
Feldman E.C. Current Concepts on the Diagnosis and Management of Hypoadrenocorticism in Dogs (VET-137b). Western Veterinary Conference 2004.
Greco D.S. Hypoadrenocorticism in Small Animals. Atlantic Coast Veterinary Conference 2002.
Lorenz M.D., Melendez L. Hypoadrenocorticism. Western Veterinary Conference 2002.