Diagnosis of Hyperadrenocorticism

A diagnosis of HyperA is usually pursued if history and clinical signs are consistent.

Greater than 95% of HyperA dogs show an elevated ALP and/or stress leukogram

The screening tests for the diagnosis of HyperA include:

Urinary Creatinine:Cortisol ratio (UCCR)

ACTH stimulation test (ACTHST)

Low dose suppression test (LDDST)

No test has 100% accuracy in diagnosis of HyperA, but all tests perform best if restricted to animals showing appropriate clinical signs and blood work.

Baseline cortisol

A baseline cortisol cannot differentiate between HyperA and normal pituitary-adrenal function.

UCCR

The UCCR is a useful screening test for HyperA because it requires a single urine sample collected at home when the dog is not stressed.

The test is highly sensitive (~90%) and a normal ratio is unlikely to occur in a dog with HyperA. However, the test is non-specific and the UCCR may be elevated in dogs that are stressed or ill as well as those with HyperA. Follow up testing (LDDST or ACTH stimulation) is warranted.

ACTH Stimulation Test

The sensitivity of ACTH stimulation for detecting HyperA ranges from 60-85% and is particularly insensitive for detecting ADH. About 15-20% of with dogs with PDH and 40% of dogs with ADH show a "normal" ACTH stimulation test response.

Specificity is reported to be 85-95% with false positive results usually occurring only in dogs with significant systemic illness.

Healthy dogs usually have pre-ACTH cortisol concentrations of 20-250 nmol/L and post-ACTH cortisol concentrations of 200-450 nmol/L.

A diagnosis of HyperA can be made in dogs with post-ACTH cortisol concentrations >600 nmol/L provided that clinical signs are consistent and there is no evidence of severe systemic disease.

The ACTH stimulation test cannot differentiate between PDH and ADH.

In iatrogenic HyperA both basal and post ACTH cortisol concentrations are usally low.

A negative result cannot be used to rule out HyperA.

Note:

- Administration of prednisolone, prednisone and hydrocortisone within 24 h of an ACTH stimulation test may cause erroneous results by cross reacting with the cortisol assay.

- Long term use of glucocorticoids including ear, eye and skin preparations may suppress the pituitary-adrenal axis causing a reduced ACTH stimulation response. A single injection of depo-medrol may suppress the post-ACTH response for 4 to 6 weeks and a single injection of dexamethasone can suppress the post-ACTH cortisol for up to 7 days.

Protocol for the ACTH Stimulation test

Fasting is not necessary

- Collect a baseline serum sample. Label "0"
- Give 5 ug/kg Synacthen IV or IM (maximum dose 250 ug)
- Collect serum 1 hour later. Label "1"

Synacthen

A study by Aldridge et. al. (2016) found that Synacthen can be given at 5 ug/kg for testing.

Reconstituted Synacthen not used at the first test can be aliquoted into smaller units and frozen for future use. Once thawed, the remainder must be discarded.

Red top tubes **cannot** be used for storing Synacthen, however, insulin syringes are OK. The samples must be maintained at -20°C and should not be placed in frost-free freezers. Synacthen remains active for 6 months when frozen.

Low Dose Dexamethasone Suppression Test

The LDDST is only useful for diagnosis of HyperA. Sensitivity is 85-100%, however specificity is low at ~45%. Dogs with non-adrenal illness and those which become stressed/excited during the 8h testing period may show abnormal LDDST results. Consequently, testing should only be undertaken in dogs with appropriate clinical signs and supporting routine blood work, and under stress free test conditions.

Protocol for LDDST

Fasting is not necessary

- Collect a baseline serum sample. Label "0"
- Give 0.01-0.015 mg/kg dexamethasone IV. **Accuracy** in dosing is important and dilution of the dexamethasone should be considered.
- Collect serum 4 hour later. Label "4"
- Collect an 8 hour serum sample Label "8"

If the animal is particularly nervous it is best to send it home and get it back at 4 and 8 hours to prevent stress affecting test outcome. If the animal stays in the hospital, then it needs to be in a quiet area with no procedures (including nail clips, and ear checks) carried out while in hospital. The elevations in cortisol during a procedure can produce inaccurate results.

Dogs with a normal pituitary-adrenal axis typically suppress to < 28 nmol/l at both 4 and 8 hours whereas dogs with HyperA usually have a cortisol above 40 nmol/l at 8 h. If the 8h cortisol is consistent with HyperA then the 4 h sample may differentiate PDH from ADH. If, however, the 4h sample cannot differentiate, adrenal ultrasonography or the HDDST is needed for further investigation.

High Dexamethasone Suppression Test

The rationale behind the HDDST is that most (85%) dogs with PDH will show suppressed cortisol concentrations at 4 or 8 h following dexamethasone. Adequate suppression is considered to be present when plasma cortisol is <50% of the baseline at either 4 or 8 h or the cortisol concentration is < 40 nmol/l at either time point. Note that, failure to suppress does not allow differentiation between PDH and ADH

Protocol for HDDST

Fasting is not necessary

- Collect a baseline serum sample. Label "0"
- Give 0.1 mg/kg dexamethasone IV
- Collect serum 4 hour later. Label "4"
- Collect an 8 hour serum sample Label "8"

The HDDST cannot be used to diagnose HyperA because normal dogs and those with PDH respond in the same manner.