Hyperadrenocorticism (Cushing's Disease)

A PowerPage Presented By

Animals exposed to excess cortisol develop the classic set of signs known as Cushing's disease. You should expect to see questions on a board exam about recognizing these signs. This PowerPage provides a review of the signs, tests, and treatments of hyperadrenocorticism in dogs with some supplemental information on equine Cushing's. It is very unlikely that you would see any questions about Cushing's in any species other than dogs and horses on a board exam, although it can occur infrequently.

Key Points

- Key clinical signs are **PU/PD, panting, polyphagia, pendulous belly, pyoderma and thin skin**
- Many diagnostic tests, low-dose dexamethasone and ACTH stimulation are 2 most important to know about for board exams
- Most cases are pituitary-dependant (PDH) and are treated medically with Lysodren (o,p' DDD) or Trilostane. Adrenal tumors (AT) are the other common cause

Relevant Pathophysiology

Signs of Cushing's disease can come from ACTH secreting pituitary tumors, cortisol secreting adrenal tumors, or iatrogenic steroid administration

Clinical Signs

- Not all animals will have all of these signs. In dogs, common signs are:
  - PU/PD
  - Panting
  - Polyphagia
  - Pendulous abdomen
  - Pyoderma and thin skin
  - Pigmentation and symmetric alopecia

- In **horses:**
  - **Hirsutism** - Abnormal, long, wavy coat. May also have some of the signs listed for dogs

Diagnosis

- On routine labwork may see:
  - **Stress leukogram**- neutrophilia, lymphopenia
  - **Elevated ALP (**alkaline phosphatase)
  - **Hyposthenuria** (USG < 1.010)

- There are many diagnostic tests for Cushing's. They are listed here in order of importance for board preparation:

1. **Low Dose Dexamethasone Suppression Test**: Measure plasma cortisol before and at 4 and 8 hours after IV dexamethasone (0.01 mg/kg). 90% of dogs with Cushing's will have 8 hour cortisol

levels >1.4 ug/dl. This test can also be used to help differentiate PDH from AT because for PDH, you often see some reduction (<50% basal value) of cortisol at 4 hours but not for AT.

2. **ACTH Stimulation Test**: Measure cortisol levels before and after administration of ACTH. Was considered the test of choice for diagnosis for many years although this is no longer true. Is still the most commonly used test for monitoring therapy for hyperadrenocorticism.

3. Abdominal Ultrasound: Performed to look for an adrenal mass compared to bilaterally enlarged adrenal glands which are expected with PDH.

4. Urine Cortisol: Creatinine Ratio: An easy and less expensive urine test with high sensitivity but low specificity (many false positives). A negative test is useful for ruling out hyperadrenocorticism.

5. Endogenous ACTH: Expensive and not routinely available but used to differentiate PDH (High plasma ACTH) and AT (low ACTH).

6. High-dose Dexamethasone Suppression Test: Similar to the low dose dexamethasone suppression test but with 0.1 mg/kg of dexamethasone. It may help differentiate PDH from adrenal Cushing's in an additional 10% of cases.

7. 17O-hydroxyprogesterone testing: Used for dogs with "atypical Cushing's" with normal low dose dexamethasone suppression test results.

Treatment

- Once again, there are many options for treatment, they are listed in order of importance for boards:

    1. Mitotane - o,p'DDD. Causes adrenocorticolysis - Essentially a chemical partial adrenalectomy. Induction and maintenance therapy must be monitored by ACTH stimulation tests to avoid causing hypoadrenocorticism.

    2. Trilostane - An oral steroid analogue that inhibits cortisol and aldosterone synthesis. Requires similar monitoring.

    3. Selegiline (Anipryl, L-Deprenyl) - Not currently recommended for the dog.

    4. Ketoconazole - May be associated with high occurrences of side effects.

    5. Surgery - Adrenalectomy or hypophysectomy are rarely performed options in North America.

- For horses, pergolide mesylate, trilostane, or cyproheptadine are options.

References and Links

Ettinger, Felman- Veterinary Internal Medicine 3rd ed pp 1460-1488

On-line Conference Proceedings from VIN
http://www.vin.com/Members/Proceedings/Proceedings.plx?CID=wsava2006&PID=pr15707&O=VIN
http://www.vin.com/Members/Proceedings/Proceedings.plx?CID=wvc2008&PID=pr19454&O=VIN
http://www.vin.com/Members/Proceedings/Proceedings.plx?CID=wvc2008&PID=pr19457&O=VIN
http://www.vin.com/Members/Proceedings/Proceedings.plx?CID=wvc2008&PID=pr19456&O=VIN
http://www.vin.com/Members/Proceedings/Proceedings.plx?CID=wrldvc2008&PID=pr23572&O=VIN
http://www.vin.com/Members/Proceedings/Proceedings.plx?CID=wvc2004&PID=pr05640&O=VIN