

Ferret Medicine and Surgery: Adrenal Disease, Insulinoma, and Lymphoma

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Adrenal gland disease in ferrets differs from adrenal disease in other species. In ferrets, the hyperplastic or neoplastic adrenal cortex produces an excess of gonadal hormones rather than glucocorticoids. Clinical signs of adrenal disease in ferrets vary according to the particular hormone(s) that the affected glands are producing, although alopecia is the most common presenting complaint. Male ferrets with an increase in serum testosterone levels may exhibit aggression, sexual behavior, increased odor and prostatic enlargement (often leading to dysuria). These clinical signs in the male ferret may occur with or without the more common finding of progressive alopecia.

Diagnosis of adrenal disease

Hormone assays

The University of Tennessee developed a commercially available assay for these hormones, and it is now available at several laboratories. The three hormones that are currently measured are estradiol, 17-OH progesterone and androstenedione.

(<http://www.vet.utk.edu/diagnostic/endocrinology/>)

Ultrasound

The identification of enlarged and/or abnormal adrenal gland(s) via ultrasound is often possible when performed by a skilled ultrasonographer (i.e. not me). However, the failure of either adrenal to be enlarged does not rule out adrenal disease. Abnormal adrenals may be normal in size (< 0.4 cm) but abnormal in texture and function. Ultrasound is recommended when surgery is being considered; the risk of surgery is higher if the right adrenal gland is affected, and even higher if this gland is invading the caudal vena cava. (which can be detected with Doppler ultrasound).

Medical treatment options

1. Benign neglect: Clinical signs of adrenal disease in female ferrets are related to alopecia, possibly pruritus and vulvar swelling. Male ferrets may develop dysuria from prostatomegaly which can be life threatening. Owners who decline treatment can be educated to monitor their ferret for dysuria. *Note: Owners often comment that their ferret is lethargic with untreated adrenal disease. Often, this lethargy is due to concurrent insulinoma. The degree of lethargy and muscle wasting that is directly attributable to adrenal disease is unknown.
2. Melatonin PO vs. Melatonin subq implants Melatonin is being used, orally and as an implant, for adrenal gland disease. Reports of its efficacy are mixed. Many clients have reported that there is a good initial response in their ferret, but after 4-9 months, the response is decreased or absent. Melatonin implants are available commercially and have growing anecdotal evidence of a positive effect in ferret adrenal gland disease.
3. Depo-Lupron^R (leuprolide acetate, depot form) a GnRH receptor agonist, suppresses adrenal production of gonadal hormones, and is used in conjunction with or in lieu of surgical resection of the affected gland(s). The usual dose is 100-200 ug/kg IM, of the one-month depository form, given q 4-6 weeks.
4. Implant form of GnRH receptor agonist: Deslorelin acetate or Suprelorin®, sold through Virbac. Available in a depot implant formulation containing 4.7 mg of the drug. Effects seem to last 6-18 months.
5. Finasteride - Proscar^R A useful medication in male ferrets with concurrent prostatic cystic disease. Designed for prostatic hypertrophy in human males, it prevents the conversion of testosterone to its active form. (Empirical dose – 0.5 mg/kg ferret)

IMPORTANT NOTE: If a male ferret has cystic prostatic hyperplasia secondary to adrenal gland secretion of testosterone:

- Anesthesia/sedation and cystocentesis often remove the pressure on the urethra and relieve the obstruction without the need for catheterization.
- In these cases, it is important to treat the prostatic/bladder infection as well as starting finasteride or it's equivalent, prior to administering a GnRH receptor agonist. The initial agonist effect of the GnRH receptor agonist may cause re-obstruction if the cystic prostatic disease is not addressed first.

Insulinoma

Insulinoma is one of the most common diseases affecting ferrets. The frequency of occurrence is approximately equal to that of adrenal gland disease. This means that this disease may affect over half of the ferrets in the U.S.

Insulinoma forms in the B- cells of the pancreas, which produce both insulin and glucagon. Other names for insulinoma include beta cell pancreatic tumor and islet cell tumor.

Affected ferrets are usually between the ages of 2 to 8 years. Some ferrets develop sudden onset of severe hypoglycemia, and the resulting low blood sugar causes the ferret to collapse, and present hypothermic and moribund. In other ferrets, the onset of hypoglycemia is more gradual and the ferret will show intermittent signs varying from decreased activity and “spaciness”, to rear leg weakness. Some ferrets will be nauseated and paw at their mouths, or have spasmodic twitching of their face and ears. If the blood sugar becomes markedly low, a ferret with insulinoma may have tremors, seizures, or present moribund and hypothermic due to lack of sufficient glucose supply to the brain.

The presence of both the above clinical signs and a low blood sugar level are usually diagnostic for insulinoma. Most veterinarians agree that a blood sugar level less than 70mg/dl is very suggestive of insulinoma, although at this level they may not be demonstrating any signs of illness. Blood glucose levels of ferrets with signs of hypoglycemia are usually less than 50g/dl, with levels in the 20-40g/dl range commonly present in seizing or comatose ferrets.

Treatment recommendations for insulinoma include surgery, medical therapy and dietary modification. The choice of therapy depends on the severity of clinical signs, the age and overall health of the ferret and owner’s preference.

Surgery involves removing the nodule or nodules of cancer within the pancreas. Often a partial pancreatectomy is performed to increase the chance of removing all affected tissue. Ferrets that have surgical removal of the affected pancreatic tissue usually have a longer period of time before they need any medical treatment, and a longer total survival time.

Medical therapy involves the daily administration of drugs that will help the body produce more glucose (sugar) and use it more efficiently. Most veterinarians start with twice daily prednisone or prednisolone @ 0.5-1 mg/kg PO q 12 hrs. Response to therapy is much more important than attempting to return the ferret’s blood glucose to normal. Most ferrets on prednisolone therapy will have an improved but still subnormal glucose level, and be clinically normal. If or when prednisone is no longer effective, another medication, diazoxide (Proglycem) may be added. Ferrets are prone to disgestive upset, Helicobacter infection and GI ulceration, so GI protectants and H-2 blockers may be advisable.

Ferrets with insulinoma should be fed many small meals throughout the day. A diet containing high quality protein and moderate levels of fat is preferred. Food with processed sugar or high levels of simple carbohydrates (such as fruit, semi moist cat food, cookies, etc.) should be avoided.

Lymphoma

Lymphoma is most common in two age groups of ferrets, much as in cats. The juvenile ferret (frequently 6-12 months of age) is often affected with mediastinal lymphoma, and may present with dyspnea, lethargy, and coughing. Multi-systemic lymphoma with abdominal organ and lymph node involvement is possible at all ages.

Gastrointestinal lymphoma may be found in both sub adult and older adult ferrets

A less common, leukemic form of lymphoma occurs most often in young adult ferrets. Acute onset is common and these ferrets often present febrile and markedly depressed. Severe blood dyscrasias (leukemic form) are often present, including anemia, thrombocytopenia, lymphocytosis, and neutropenia. A pathology review of the CBC may be suggestive or diagnostic, or bone marrow biopsy may be needed for diagnosis. Prognosis with treatment is not well documented; many ferrets seem to succumb before diagnosis is obtained and treatment is initiated.

Older ferrets with lymphoma have more variable presentations. Peripheral lymphadenopathy does occur, but the practitioner should be cautious when palpating peripheral lymph nodes to differentiate between the pronounced accumulation of fat that commonly surrounds these lymph nodes and the actual node itself lying within the fat. Lymph node excision usually provides conclusive histopathology, whereas aspirates are difficult due to the surrounding fat and the relatively small size of even enlarged nodes. The popliteal lymph node in ferrets is easily accessible for resection and not as vascular as in dogs and cats.

Splenic lymphoma may occur, but without FNA or biopsy and histopathology it is difficult to even tentatively diagnose due to the nearly universal splenic enlargement (usually benign extra-medullary hematopoiesis) that occurs as ferrets of the U.S. gene pool as they age.

Involvement of the liver in lymphoma is relatively common in older ferrets, and an ultrasound guided FNA is often diagnostic.

Cardiac (hilar) lymphadenopathy occurs with some frequency in ferrets with lymphoma, and may be confused with cardiomyopathy on radiographs. A thoracic ultrasound, fine needle aspirate and echocardiogram are often needed to help determine the nature of the thoracic radiographic changes.

The prognosis with chemotherapy is good, assuming an initial remission is achieved. Older literature often notes a poor response to chemotherapy, which unfortunately has dissuaded many practitioners from suggesting that owners pursue treatment.