

Adrenal Disease in Ferrets

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The adrenal glands are small organs, about the size of a lentil, and are located in the abdomen. There are two glands, one on either side near the kidneys. The adrenal glands are a very important source of hormone production in the body of all mammals, including people and ferrets. There is a common condition in ferrets where the adrenal gland becomes abnormally large and begins to produce certain hormones at an excessive rate. Several hormones may be involved, particularly the sex hormones like estrogen and testosterone. Called "hyperadrenalcorticism" or just adrenal gland disease, this is a common ailment in middle-aged and older ferrets.

Adrenal disease usually occurs in ferrets over 3 years of age but can sometimes be seen in younger ferrets. Clinical signs include varying degrees of fur loss, often combined with itchy skin. The fur loss may begin as a subtle thinning of the coat, usually on or near the tail. In time, this fur loss progresses down the back and sides until the ferret becomes noticeably "bald". Some spayed females will develop a swollen vulva very similar to the normal non-spayed female in heat (effects of estrogens). Neutered male ferrets can become aggressive and behave like intact males (effects of testosterone). Owners may report a stronger than usual odor in both sexes. Some ferrets have trouble urinating (see below). In some long-standing cases, bone marrow suppression can occur and result in anemia and low platelet counts. These ferrets bruise readily and may develop small red blood spots in the skin. These cases require immediate and aggressive veterinary therapy. Fortunately, this is uncommon.

Diagnosis is based on clinical signs, palpation of adrenal glands, sonogram (or "ultrasound") of the glands, and ultimately, surgical biopsy of the gland. Routine blood tests cannot diagnose the disease but are recommended to monitor the health of other organ systems. Blood hormone levels are commercially available (at the University of Tennessee Veterinary School) but this is an expensive test and can take 4 weeks for results. Abdominal sonograms can be performed by an experienced ferret ultrasonographer and for the money (about \$175-200), may be the best pre-surgical assessment of the adrenal glands, as well as other organs in the abdomen.

Surgical Therapy for Adrenal Disease

Surgical treatment involves removal of the affected gland. This can be difficult depending on which gland is involved. The left-sided gland is the easier one to remove and is the gland most often affected. The right gland is adhered to the vena cava, the largest vein in the body. Surgery of this gland can be tricky and an experienced ferret surgeon is recommended. In a small number of cases, both glands may be affected. Removal of one gland and biopsy of the second or removal of both glands is recommended in these cases. Some of these glands are cancerous but metastasis (spread to other organs) is rare and prognosis is good with surgical removal. Most ferrets are disease-free following surgical removal of the affected gland.

There may be other surgical conditions affecting the ferret with adrenal disease, like pancreatic tumors (insulinoma), or hairballs in the stomach (from all that itchy skin). Abdominal surgery in these ferrets can often correct and/or diagnose multiple conditions and greatly improve the quality of life.

Medical Therapy for Adrenal Disease

Traditional medical therapy for hyperadrenalcorticism in other species (Lysodren and ketoconazole) has variable effects and is not considered effective. New hormonal therapies for adrenal disease in ferrets are currently being researched. Experimental treatment with the human drug leuprolide (Lupron®) is underway. Lupron decreases levels of testosterone and estrogens. Lupron comes as powder that needs to be reconstituted. It comes as a 1-month or 4 month depot injection. The 4-month injection may alleviate clinical signs as long as 7 months. The one-month drug usually needs to be administered every 1-2 months. These drugs are very expensive, e.g., wholesale cost of the 4 month ferret shot is about \$200 (it's about \$2000 for the human dose!)

Other experimental drug therapies include Arimidex® and Casodex®. Arimidex blocks testosterone conversion into estrogen. Casodex® inhibits testosterone and may be useful for those male ferrets that are straining to urinate.

Hormonal treatment of adrenal disease only alleviates clinical signs. It appears that these drugs have no obvious effect on the tumor size or growth. Surgical excision is still the treatment of choice but in some cases where surgery is not an option, "informed-consent" use of these drugs may be indicated.

Adrenal Disease and Urinating Difficulty

This is a well-recognized "syndrome" seen in neutered ferrets with hyperadrenocorticism. A cyst-like structure can develop around the urethra as it empties the bladder and results in inflammation, infection, straining to urinate (and defecate), and sometimes complete urinary obstruction. Some of these ferrets develop urinary tract problems before losing hair. It is thought that the overproduction of adrenal androgens (male hormones like testosterone) stimulates growth and cyst formation of the normally very small ferret prostate. This enlargement results in urine outflow obstruction. Although this is seen mostly in male ferrets, we have occasionally diagnosed this in spayed females. Although females do not have a prostate, there may be some reproductive tract remnant in the same location as the male prostate and with excessive hormones, the effect is similar.

Diagnosis is based on clinical signs, palpation, radiographs, or ultrasound. Ultrasound may be the best diagnostic test to image the cysts. Ferrets with completely blocked urinary bladders are emergencies; urine from the kidneys continues to fill the bladder and ultimately the bladder will rupture if the obstruction is not relieved. Tiny urinary catheters (tubes) are placed into the bladder to try to empty it but this is a temporary measure. Correction is surgical; the affected adrenal gland must be removed and the cysts are suctioned empty with a needle or removed. Often the cystic structures will recede once the hormone levels are reduced. Lupron may temporarily reduce hormone levels and allow urine to flow easier.

No one really knows the cause of adrenal disease in ferrets, but there are some speculations and theories as to why this is so common. Very early neutering is thought to play a role; most pet ferrets in the U.S. are neutered before 6 weeks of age and maybe at a time when the adrenal glands are still developing. Disruption of the adrenal gland-pituitary-genital feedback mechanisms at such a young age may be significant. The role of in-breeding and genetics has yet to be explored.