



Adrenal Gland Tumor Removal (Adrenalectomy) in Cats

What are the adrenal glands?

The adrenals are a pair of distinct endocrine glands, located close to the kidneys. Each adrenal gland has two parts.

- A. Adrenal Cortex
- B. Adrenal Medulla

The outer part (cortex) is controlled by a hormone (adrenocorticotrophic hormone, ACTH) from the pituitary gland.

The **cortex** produces steroid hormones of several types.

- a. One group acts with the kidney to control salt concentrations in the body,
- b. while a second group is the sex hormones.
- c. The third type has many actions including reduction of inflammation, healing and activity of the immune system. This hormone also controls carbohydrate and fat metabolism in conjunction with other hormones from the pancreas.

The inner part (**medulla**) of the gland originates from the same cells that develop into the nervous system in the embryo. Therefore, it is not surprising that it produces neuroendocrine hormones with effects similar to those of the sympathetic nervous system.

What tumors occur in the adrenal cortex?

Tumors of the cortex of the adrenal glands may be hyperplasia (non-cancerous cell overgrowths) or cancers, either benign (non-spreading) or malignant (spreading). Usually they produce hormones that will have secondary clinical effects elsewhere in the body.

What do we know about the cause?

These tumors often develop after prolonged stimulation of the adrenal cortex. There is a continuous spectrum of abnormal change ranging from small areas of hyperplasia to benign and then malignant cancer. The stimulation may be due to overproduction of pituitary hormones that control the gland, or excess of these or similar hormones from an external source such as medicines or chemicals in the environment. Sometimes disruption of the natural regulation of hormone production ('feedback control') by the gland results in over-stimulation. Cancer induction is a multi-step process called 'tumor progression'. Some cancers never progress past the first stages so remain benign. Others progress rapidly.

Are these common tumors in cats

Adrenal tumors are an uncommon finding in cats. Based on available data, it is estimated that approximately 0.03% of the feline population (representing 0.2% of all cat tumors) develop a primary adrenal gland tumour. Metastasis to the adrenal glands from other organs is uncommon but when it does occur, lymphoma seems to be the most common.

An adrenal tumour may be functional (i.e., producing and secreting a hormone) or nonfunctional. In cats, adrenocortical tumors can secrete excessive amounts of cortisol, progesterone and other sex steroid hormones, or aldosterone. Feline adrenal medullary tumors (pheochromocytoma), although extremely rare, secrete excessive amounts of catecholamines.

How will these cancers affect my pet?

A. Cortisol-Secreting Adrenal Tumors

A cortisol-secreting adrenal mass causing hyperadrenocorticism is the most common functional adrenal tumour identified in cats. Naturally occurring hyperadrenocorticism (Cushing's syndrome) is rare in cats. Pituitary-dependent hyperadrenocorticism accounts for the majority of cases, but cortisol-secreting adrenocortical neoplasia is responsible in approximately 20% of cats. About one-third of these adrenal tumors in cats are malignant.

Clinical findings in cats with cortisol-secreting adrenal tumors may include lethargy, weakness, pendulous abdomen, thin fragile skin, bilaterally symmetric alopecia, dull haircoat, seborrhea sicca, muscle atrophy, polyuria, polydipsia, and polyphagia. In contrast to dogs with hyperadrenocorticism, polyuria and polydipsia in affected cats appear to be secondary to concurrent diabetes mellitus in the vast majority of cases.

Unilateral adrenalectomy is most successful method of treating cats with cortisol-secreting adrenocortical tumour. In cats with adrenal adenoma or adrenal carcinoma that has not yet metastasized, adrenalectomy may be curative.

B. Sex hormone Secreting Adrenal Tumors

A functional tumour arising from the adrenal cortex could secrete excessive amounts of adrenal progestagens, androgens, or estrogens. Progesterone-secreting adrenal tumors have been the most common sex hormone secreting adrenal tumour reported in cats

Clinical signs are similar to those in cats with cortisol-secreting tumors. Excessive progesterone secretion in affected cats causes diabetes mellitus and feline fragile skin syndrome, which is characterized by progressively worsening dermal and epidermal atrophy, endocrine alopecia, and easily torn skin.

Diagnosis requires documenting an increased concentration of one or more adrenal sex steroids, ideally measured before and after ACTH stimulation.

Recently, a male cat that had developed strong urine odor and aggressive behavior was documented to have a functional adrenal adenoma associated with high circulating concentration of androstenedione and testosterone.

After adrenalectomy, serum concentrations of the androgens decreased and urine spraying urine aggression resolved.

C. Feline adrenal medullary tumors (pheochromocytoma)

Pheochromocytoma is a catecholamine-producing tumor derived from the chromaffin cells of the adrenal medulla that is extremely rare in cats

How are these cancers diagnosed?

This type of cancer is often suspected based on the typical clinical signs. X-rays, ultrasound and MRI (magnetic resonance imaging) or CT (computerized tomography) scans may be useful in detecting the tumors, including metastases.

Blood tests help to identify functional tumors of the pituitary and adrenal cortex.

However, to diagn

ose the tumor type precisely, it is necessary to examine the tumor itself. This involves exploratory surgery, often with total removal of the tumor. The tissue samples are submitted for microscopic examination using a diagnostic technique called histopathology. Specially prepared and stained tissue sections are made at a specialized laboratory where the slides will be examined by a veterinary pathologist.

The histopathology report typically includes words that indicate whether a tumor is 'benign' (non-spreading, local growth) or 'malignant' (capable of spreading to other body sites). These, together with the origin or type of tumor, the grade (degree of resemblance to normal cells or 'differentiation') and stage (how large it is and extent of spread) indicate how the cancer is likely to behave.

The veterinary pathologist usually adds a prognosis (what will probably happen). This may include information on local recurrence or metastasis (distant spread).

What types of treatment are available?

Primary adrenocortical tumors may be removed surgically or managed medically, depending on the individual case.

Medical treatment, as for the pituitary tumors inducing secondary adrenal malfunction, is only successful if the cancer is still responding to pituitary hormones.

After Care:

After any surgery, you need to prevent your pet from interfering with the operation site and to keep it clean. Any loss of stitches or significant swelling or bleeding should be reported to your veterinarian. You may be asked to check that your pet can pass urine and feces or to give treatment to aid this. If you require additional advice on post-surgical care

When will I know if the cancer is permanently cured?

Adrenal cortical tumors that can be treated surgically may be cured, but it is more probable that on-going medical treatment will be necessary.