



ENDOCRINE TUMORS - ADRENAL CORTEX

These notes are provided to help you understand the diagnosis or possible diagnosis of cancer in your pet. For general information on cancer in pets ask for our handout "What is Cancer". Your veterinarian may suggest certain tests to help confirm or eliminate diagnosis, and to help assess treatment options and likely outcomes. Because individual situations and responses vary, and because cancers often behave unpredictably, science can only give us a guide. However, information and understanding for tumors in animals is improving all the time.

We understand that this can be a very worrying time. We apologize for the need to use some technical language. If you have any questions please do not hesitate to ask us.

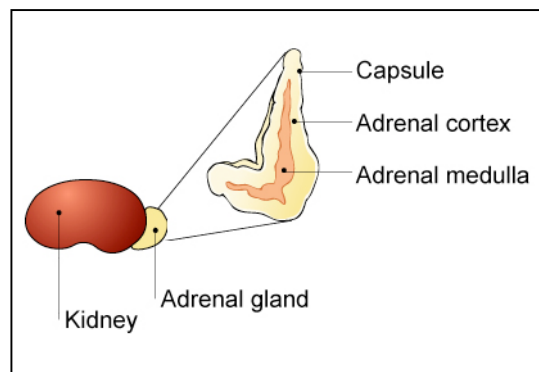
Endocrine glands produce specialized chemicals called "hormones". These regulate and integrate many activities to maintain internal stability of the body. The hormones pass directly into the blood to affect target cells elsewhere. The distinct endocrine glands are the adrenals, thyroid, parathyroids, pituitary glands and islets in the pancreas although certain hormones are also produced by many cells elsewhere in the body. The pituitary gland at the base of the brain links to other endocrine glands and regulates hormone production by the adrenals, thyroid and sexual organs as well as growth and our day to day cycles of activity (diurnal rhythm).

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.

The outer part (cortex) is controlled by a hormone (adrenocorticotrophic hormone, ACTH) from the pituitary gland. The cortex produces steroid hormones of several types. One acts with the kidney to control salt concentrations in the body, a second group are sex hormones. The third type has many actions including reduction of inflammation, healing and activity of the immune system. The 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 in the embryo form the nervous system, and therefore not surprisingly it produces neuroendocrine hormones with effects similar to those of the sympathetic nervous system.



What are the tumors of the adrenal cortex?

Tumors of the cortex of the adrenal glands may be overgrowths (hyperplasias) or benign (non-spreading) or malignant (spreading) cancers. Usually they are producing hormones that will have secondary clinical effects elsewhere in the body.

What do we know about the cause?



Prolonged stimulation of the adrenal cortex is often the cause of development of these cancers with a continuous spectrum of abnormal change 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 multistep process called 'tumor progression'. Some cancers never progress past the first stages so remain benign. Others progress rapidly.

Why has my pet developed this cancer?

Some animals have a greater tendency (genetic susceptibility) to cancer. Some breeds have far more cancers than others, often of specific types. In many cases, these tumors need prolonged stimulation to start growing and, sometimes, to enable them to persist.

Are these common tumors?

None of these tumors are common. Tumors of the pituitary, which produce the hormone (ACTH), results in over-stimulation of the adrenal cortex leading to clinical signs associated with adrenal cortical hormone excess. Such pituitary tumors are more common than primary tumors of the adrenal itself. In dogs, benign tumors of the adrenal cortex are the most common type and are seen in older animals. Adrenal tumors of all types are rare in cats.

How will these cancers affect my pet?

Clinical signs of primary pituitary tumors secondarily affecting the adrenal glands and of primary tumors of the adrenal cortex are the same. These signs include increased appetite and thirst, loss of hair, dry skin and "blackheads" on the belly. Some animals also have hard (calcium) masses in the skin on the neck and back with ulcers and formation of pus, redistribution of body fat and weakening of muscles so the abdomen sags. The immune system is damaged so infections persist for longer than normal. Some dogs are also diabetic. Some tumors of the adrenal cortex produce excessive sex hormones. Malignant adrenal cancers may spread through the body by invading the adjacent blood vessels and seeding new tumors in body cavities and other organs.

How are these cancers diagnosed?

Cancer is often suspected from clinical signs. X-rays, ultrasound and MRI (magnetic resonance imaging) or CT (computerized tomography) scans may be useful in detecting the tumors, including metastases.



Advanced diagnostic imaging such as ultrasound may be required



Blood tests help to indicate functional tumors of the pituitary and adrenal cortex. However, to identify 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 by histopathology. Specially prepared and stained tissue sections are made at a specialised laboratory where the slides are 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?

Adrenocortical tumors are usually removed surgically, sometimes with medical treatment as well. Medical treatment, as for the pituitary tumors inducing secondary adrenal malfunction, is only successful if the cancer is still responding to pituitary hormones.

Can these cancers disappear without treatment?

It is not common, but the loss of blood supply to a cancer can make the cells die. Unfortunately, the disappearance of the cancer is rarely complete.

How can I nurse my pet?

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, please ask.

Medical treatment of these tumors involves the use of toxic drugs so monitoring of your animal is essential. Good observation by you will enable this to be more accurate and improves the outlook because relapses are common. Please ensure you understand what you should check, how frequently and signs you should look out for.

How will I know how the cancer will behave?

This information will help you to understand the different types of tumors. Your veterinarian will be able to explain how the specific tumor in your animal is likely to respond to treatment and behave in the future.

Histopathology will give your veterinary surgeon the diagnosis that also helps to indicate how a tumor is likely to behave. The veterinary pathologist usually adds a prognosis that describes the probability of local recurrence or metastasis (distant spread) for cancers.

When will I know if the cancer is permanently cured?

'Cured' has to be a guarded term in dealing with any cancer.

Adrenal cortical tumors that can be treated surgically may be cured, but it is more probable that on-going medical treatment will be necessary. The treatment needs monitoring and life expectancy is variable from days to ten years and averaging less than three years. Good observation by you, the owner, improves the outlook because relapses are common. Deaths are due to problems associated with the original disease (e.g. heart failure, infection, pancreatic disease such as diabetes) rather than related to drug toxicity.



Are there any risks to my family or other pets?



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No, these are not infectious tumors and are not transmitted from pet to pet or from pets to people.