



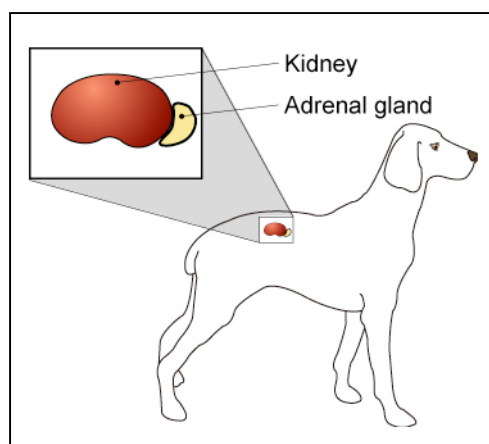
ENDOCRINE TUMORS - ADRENAL MEDULLA

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.

What are the adrenal glands?

The adrenal glands are located close to the kidneys. They are part of the body's endocrine system, the glands of which also include the pituitary (in the brain), thyroid, parathyroid and Islets of Langerhans in the pancreas. 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. Hormones are also produced by many cells in other tissues.



Each of the two adrenal glands 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.

The inner part (medulla) of the adrenal 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 medulla?

Tumors of the medulla of the adrenal glands may be hyperplasias (non-cancerous cell overgrowths) or cancerous. Adrenal medullary tumors are rare but pheochromocytomas are the most common type and are usually in middle aged to older dogs. Tumors of the nerve cells of the medulla are rare but benign adrenal ganglioneuromas occur in older animals and malignant adrenal neuroblastomas can develop in young animals. Few are diagnosed until late in the disease because, unlike tumors of the adrenal cortex, medullary tumors do not produce clinical signs. Approximately half spread to other parts of the body (metastasize).

What do we know about the cause?

The reason why a particular pet may develop this, or any cancer, is not straightforward. Cancer is often seemingly the culmination of a series of circumstances that come together for the unfortunate individual.



We know little about the cause of tumors of the adrenal medulla.

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. Adrenal medullary pheochromocytomas are most common in Boxer dogs.

How will these cancers affect my pet?

Small medullary pheochromocytomas usually have no clinical effect but approximately half are larger and invade the main vein (vena cava) returning to the heart. This impairs blood return from the hind legs. At least a quarter of the tumors spread to other organs, including the adjacent back bones. The tumors are occasionally functional and induce high blood pressure, increased heart rate and enlargement of the heart. Medullary ganglioneuromas are usually benign but the neuroblastomas that develop in young animals may spread through the body cavity.

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.

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 specialized laboratory where the slides are examined by a veterinary pathologist.



Advanced diagnostic imaging such as ultrasound may be required



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?

Treatment for adrenal medullary tumors is surgical removal of the tumor.

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.

How will I know how the cancer will behave?

When histopathology is done, it will give your veterinarian 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.

Most adrenal medullary tumors are large by the time they are diagnosed because few of them produce hormones and so there are no early clinical signs. Approximately half of these tumors will spread to distant organs (metastasize).

Are there any risks to my family or other pets?

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