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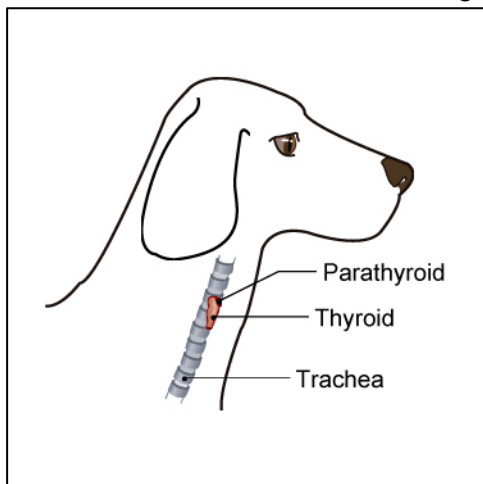
THYROID TUMORS

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 thyroid glands?

The thyroid gland is a two-lobed organ wrapped partially around the front of the trachea (windpipe) just below the throat. Its function is the production and release of the thyroid hormones. Hormones are specialized chemicals that regulate and integrate many activities to maintain internal stability of the body. The hormones, as released, from the various hormone-producing sites (endocrine glands) pass directly into the blood to affect target cells elsewhere. The distinct endocrine glands besides the thyroid are the adrenals, parathyroids,



pituitary and islets in the pancreas, although hormones are also produced by many cells in other tissues.

The hormones produced by the thyroid are thyroxine and triiodothyronine. The release of these hormones is controlled by other hormones released from the pituitary gland in the brain. Thyroid hormones increase the pace at which the body works (metabolic rate) by activating energy metabolism and facilitating the making of new protein. More glucose and protein is made, fats such as cholesterol are converted to other substances, heart rate and blood flow are increased and, in young animals, brain development is stimulated.

What are the tumors of the thyroid?

Thyroid tumors include cystic structures called goitres, multinodular overgrowth (hyperplasia), benign (non-spreading) cancers (adenomas) and malignant (spreading) cancers (carcinomas). Hyperplasias and adenomas grade into each other and most produce excessive quantities of thyroid hormones. These induce complex clinical syndromes. Malignant thyroid tumors rarely produce hormones but they may spread both locally and to the lungs. Up to a third of thyroid carcinomas in dogs may originate from specific cells in the

thyroid glands (C-cells) that act in combination with the hormones of the parathyroid glands to regulate blood calcium.

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.

One non-cancerous tumor of the thyroid called '**colloid goitre**' is due to inactivity of the gland. This is often caused by tumors in the pituitary gland preventing production of the pituitary hormone that controls the thyroid. There are numerous drugs and illnesses that can produce similar non-cancerous goitre but such goitres are rarely large enough to see clinically.

Prolonged stimulation of the thyroid gland often causes cancerous changes with a continuous spectrum from small areas of overgrowth (hyperplasia) to benign **thyroid adenoma** and then malignant cancer (**thyroid adenocarcinoma**). This multi-step process is called tumor progression. Some cancers never progress past the first stages so remain benign.

Iodine is needed to make thyroid hormones. When excess iodine is present in the diet, tumors may progress more rapidly. It has therefore been suggested that wide variations in dietary iodine may be a cause of thyroid tumors in cats, although some environmental chemicals and irradiation can also cause thyroid cancer.

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. The more divisions a cell undergoes, the more probable is a mutation so cancer is more common in older animals.

Are these common tumors?

Malignant thyroid tumors are moderately common in dogs. Boxers, beagles and golden retrievers are said to have more thyroid tumors than other breeds.

Benign thyroid tumors (hyperplasia and benign adenomas) are common in older cats but less common in Siamese cats than other breeds.

How will these cancers affect my pet?

In dogs, most thyroid tumors do not produce hormones so the main clinical signs are a swelling in the neck, which may press on the wind pipe (trachea) to cause difficulty in breathing. Pressure on the gullet (esophagus) can cause difficulty in swallowing.

Cats with thyroid tumors have similar clinical signs to those in dogs but most tumors in cats produce hormones. Additional clinical signs therefore include weight loss, increased appetite, increased thirst and urine production, restlessness and an increased and irregular heart rate.

How are these cancers diagnosed?

Thyroid cancer is often suspected from clinical signs. Routine blood and urine tests may suggest thyroid disease but function tests are needed to confirm abnormal hormone production in the gland. Thyroid imaging is available in a few specialized centers and can show the extent of the problem.



Definitive diagnosis of tumor type relies upon microscopic examination. Various degrees of surgical sampling are possible but the larger the sample, the more accurate the diagnosis. Cytology, the microscopic examination of cell samples, is not diagnostic for these tumors. Accurate diagnosis, prediction of behavior (prognosis) and a microscopic assessment of whether the tumor has been fully removed rely on microscopic examination of tissue (histopathology). This is done at a specialized laboratory by a veterinary pathologist. Only examination of the whole lump will indicate whether the cancer has been fully removed.

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?

In cats, thyroid tumors are often treated medically before surgical removal. In some cases only medical or radioactive iodine treatment is used. This treatment needs monitoring. In dogs, the usual treatment is surgery but radioiodine, external beam irradiation and chemotherapy have also been used.

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 for certain signs that indicate low blood calcium. This can happen as the parathyroid glands, which help regulate blood calcium, are situated within and around the thyroid gland. Sometimes you may need to give calcium and Vitamin D supplements. If you require additional advice on post-surgical care, please ask.

Medical treatment of thyroid tumors involves the use of toxic drugs but no hospitalization although monitoring your animal is essential. You will be asked to check for certain signs that indicate recurrence of disease or toxicity of the drugs. Radioactive treatment with radioiodine involves a significant stay in hospital for your pet but tumors rarely recur after treatment and side effects are minimal.



How will I know how the cancer will behave?

Blood tests will indicate if there is a functional problem. Histopathology will give your veterinarian the tumor diagnosis that helps to indicate how it is likely to behave. The veterinary pathologist usually adds a prognosis that describes the probability of local recurrence or metastasis (distant spread).

When will I know if the cancer is permanently cured?

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

After surgery, a return to normal thyroid function can be expected in one to two days but this does not guarantee there will be no recurrence. Medical and radioactive treatment takes up to three and four weeks respectively to take effect. Recurrence of thyroid tumors is common with medical treatment alone but less common following surgery and uncommon after radioiodine treatment. Monitoring of heart rate and appetite is sometimes helpful to assess progress.

90% of thyroid tumors in dogs are malignant and diagnosis is often too late for a cure. The more advanced the cancer, the larger and more fixed it becomes in position whereas early cancers are freely moveable. Early removal results in longer survival. One study indicated that if the tumor is freely moveable without evidence of metastasis, survival time following surgical removal is, on average, longer than 36 months. If there is recurrence, you may be able to feel tumor cells in cords in the neck as they move down to the lungs.

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.