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URINARY TRACT TUMORS

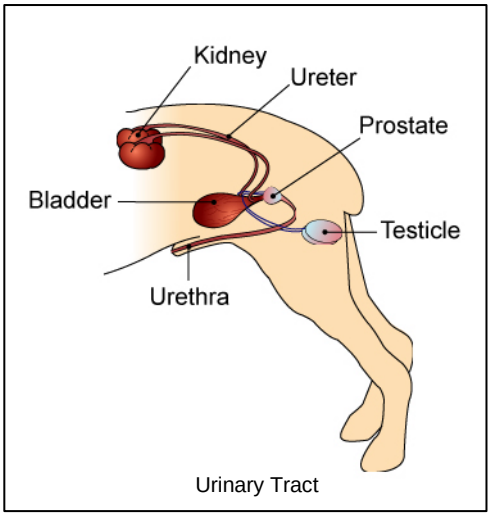
These notes are provided to help you understand the diagnosis or possible diagnosis of cancer in your pet. For general information on cancer in pets ask for our handout "What is Cancer". Your veterinarian may suggest certain tests to help confirm or eliminate diagnosis, and to help assess treatment options 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 these tumors?

Kidney tumors are rare in dogs and cats. When they do occur, they are almost invariably malignant (invasive and spreading) and called **renal carcinoma**. These tumors tend to invade the adjacent tissues including the main draining blood vessel of the kidney (renal vein). They then spread through the body (metastasize). This often happens before clinical signs are noticed but if they are found early enough, removal of the affected kidney can be curative. A congenital kidney tumor called **embryonal nephroma (nephroblastoma)** occurs in a few dogs. Most eventually become very large and widespread metastasis to lung and liver occurs in over half the affected dogs.

In cats, the most common tumor found in the kidney is not from the kidney tissue but is a tumor of lymphocytes (**lymphosarcoma** or **lymphoma**). The tumor will also be in other parts of the body. Tumors of supporting connective tissues can occur in any part of the body.



Urinary Tract

Bladder tumors vary from pre-cancerous, chronic, hyperplastic inflammation (cystitis) to benign **papillomas** and malignant **carcinomas**. '**Transitional carcinoma'** is the most common name given to tumors of the lining of the urinary tract with '**urothelial carcinoma**' sometimes used for those arising outside the bladder (in the urethra). There is gradation and progression from the benign to malignant types so both hyperplasia and metaplasia (change from the normal type of tissue) are regarded as pre-malignant. Animals with malignant tumors do not usually survive longer than a year. Less commonly cancer may arise from the muscle of the bladder. These tumors rarely metastasize.

What do we know about the causes?

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 do not know the precise cause of most kidney tumors but embryonal nephroma is a neoplastic transformation of cells during formation of the kidney before birth. In people, chromosomal abnormalities are associated with the tumor.

In German Shepherd dogs (and occasionally in other breeds such as Golden Retrievers and Boxers), there is an abnormal gene on chromosome 53 associated with a syndrome of kidney tumors and skin nodules (nodular dermatofibrosis).

Tumors of the bladder of people have been associated with contact with certain industrial chemicals, smoking and infection with parasites. In cattle and sheep, bladder tumors occur where bracken fern is grazed and many tumors in cattle contain species specific papilloma viruses. The bladder is also damaged by excretion of large quantities of metabolites of the essential amino acid tryptophan in the urine and this has been implicated as a cause in dogs. Cats metabolize tryptophan differently so bladder cancer is rarer. Cancer induction is a multistep process called tumor progression. Causes of chronic cystitis (infections and stones or calculi) also start this progression towards cancer. Tumors have also been reported in dogs and people following immunosuppressive drug therapy with cyclophosphamide.

Why has my pet developed this cancer?

Some animals have a greater tendency (genetic susceptibility) to cancer and some breeds have specific types such as that seen in German Shepherd Dogs. The Scottish Terrier is said to be at particular risk from developing bladder cancer. In most cases, the more divisions a cell undergoes the more probable is a mutation so cancer is more common in animals with chronic inflammation and in older animals.

Are these common tumors?

All renal tumors are rare. Renal carcinoma is most common in middle-aged male dogs. In cats, the tumors are even rarer but again are mainly in males. They occur between two and thirteen years of age. Animals with embryonal nephroma have that tumor from birth but the tumor may not be detected until much later in life. Many kidney tumors are multiple and some are found in both kidneys.

Bladder tumors are common in dogs but more rarely recorded in cats. In dogs, 90% are epithelial tumors and most are malignant.

How will this cancer affect my pet?

Clinically, kidney tumors are difficult to detect in the early stages. Later, there is usually swelling of the abdomen, blood or protein in the urine and non-specific signs of illness such as weight loss, lethargy and vomiting.

German Shepherd dogs (and occasionally other breeds) sometimes have fibrous nodules in the skin, particularly of their lower hind legs. The associated kidney disease starts as benign growths but progresses to malignancy with clinical signs as above. There are also associated benign tumors of the uterus (leiomyomas) in bitches.

Bladder tumors cause difficulty or pain in passing urine, abdominal pain and sometimes incontinence. There is usually blood or protein in the urine, in approximately 25% cases with

bacterial infection. Weight loss due to loss of body fat and muscle is common when tumors are malignant and a few animals have signs such as lameness or shortness of breath which are due to metastases. A few of these tumors induce signs that are not readily explained by local or distal spread of the tumors. These paraneoplastic syndromes include increased blood calcium and liver enzyme concentrations.

How is this cancer diagnosed?

X-rays may be useful in detecting kidney tumors, including metastases. Ultrasound and intravenous pyelograms (a special technique using an X-ray opaque material injected into the blood and revealing kidney structure by contrast) are usually diagnostic. Blood tests can help indicate some tumors because the abnormal kidney produces a hormone (erythropoietin) that stimulates red blood cell production. Cytology of urine is rarely helpful in detecting the tumors.

Abdominal X-Ray

From: Abdominal Radiology by Judy Hudson
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Bladder disease is usually diagnosed from the clinical signs and urine analysis. Blood tests may indicate abnormalities suggestive of chronic bladder disease. Cytology of urine can diagnose approximately one in three cases but needs careful interpretation. Distinction between chronic cystitis and cancer is usually possible with contrast X-rays of the bladder. A marker for urological tumors (basic fibroblast growth factor) is used in human beings and has been detected in the urine of dogs with bladder cancer but it is not yet generally available.

Histopathology, the microscopic examination of specially prepared and stained tissue sections, will also give a definitive diagnosis. Small biopsies of bladder tumors may be taken for diagnosis but most diagnoses are made when the tumor is removed. This is done at a specialized 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). Malignancy is often shown by tumor names ending in “carcinoma” or “sarcoma”. 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 (prognosis).

What types of treatment are available?

Treatment for kidney tumors is surgical removal of the affected kidney. If tumors are present in both kidneys, curative treatment is impossible. There are no other effective treatments.

Treatment for bladder tumors is surgical removal of the lump. Unfortunately, by the time of diagnosis, most have spread to other parts of the body or are too widespread in and around the bladder to allow full removal.

Inflammation–promoting substances called prostaglandins are produced by these tumors. Treatment with non-steroidal anti-inflammatory drugs that reduce prostaglandin production can therefore give some clinical relief. Such treatment has caused remission of some tumors. The success of other chemotherapy treatment is controversial. A mixture of heavy metal-containing drugs has been said to increase survival time but the toxic effects of these have to be considered.

Can this cancer disappear without treatment?
Cancer very rarely disappears without treatment. Spontaneous loss of blood supply to the cancer can make parts of it die but dead tissue produces toxins and some invariably remains to need surgical removal. The body's immune system is not effective in causing these tumors to regress.

How can I nurse my pet?
After surgery, the operation site similarly needs to be kept clean and your pet should not be allowed to interfere with the site. Any loss of sutures or significant swelling or bleeding should be reported to your veterinarian.

You may be asked to check or give treatment to ensure your pet drinks adequately and that he or she passes urine and feces. You may also need to ensure a urinary catheter remains clean. Your pet may require a special diet. If you require additional advice on post-surgical care, please ask.

How will I know how this cancer will behave?
Histopathology will tell your veterinary surgeon the type of tumor 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).

Renal carcinomas in dogs metastasize in 50-60% of cases. In cats, there are too few cases to be able to give such an estimate. In dogs, the most probable sites for metastasis are lung, liver, abdominal cavity, adjacent adrenal gland and skin.

Chronic cystitis and benign epithelial tumors progress to malignancy. Malignant tumors have already metastasized in 20% cases by the time they are presented to veterinarian. Some tumors have some histological features that are more likely to be associated with metastasis. These include some histological types, higher grading, less infiltrates of lymphocytes (immune system cells) and spread along the urinary tract below the bladder. Neutered female dogs tend to survive longer than neutered males after surgery (approximately a year compared with five months for the males). Sadly, only 16% of animals with these tumors will survive longer than a year.

Muscle tumors of the bladder are usually cured surgically.

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.

This client information sheet is based on material written by Joan Rest, BVSc, PhD, MRCPath, MRCVS.