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VOLUME TWO | CONTENTS

Lymphoma		4
Mast Cell Tumour		10
Soft Tissue Sarcoma		15
Osteosarcoma		20
Haemangiosarcoma		25
Oral Tumours		30
Anal Sac Adenocarcinoma		36
Client Care		41
	Mast Cell Tumour Soft Tissue Sarcoma Osteosarcoma Haemangiosarcoma Oral Tumours Anal Sac Adenocarcinoma	Mast Cell Tumour Soft Tissue Sarcoma Osteosarcoma Haemangiosarcoma Oral Tumours Anal Sac Adenocarcinoma

CHAPTER ONE LYMPHOMA





1. LYMPHOMA

DISEASE OVERVIEW

Lymphoma is a cancer that arises from an uncontrolled proliferation of lymphoid cells. As it is a cancer of a type of white blood cell, lymphoma can arise within the lymph nodes or it can arise in any site throughout the body. It is the most common cancer in cats and it is observed with relative frequency in dogs.

In some cases, lymphoma may remain localised within the lymphatic system or within its organ of origin. In most cases, lymphoma is multicentric, resulting in more widespread disease.

Usually, the inciting cause of lymphoma is unknown. In cats there is a significant correlation between the development of lymphoma and infection with FeLV and FIV. Both feline leukaemia virus and feline immunodeficiency virus are known to contribute to the development of feline lymphoma, although this effect is more pronounced with feline leukaemia virus. Fortunately, increases in feline vaccination have decreased the incidence of feline leukaemia-associated feline lymphoma and the overall rate of lymphoma diagnosis in young cats.

In dogs the most common locations for lymphoma include:

- Multicentric lymphoma: this is the most common form of canine lymphoma, affecting the peripheral lymph nodes and internal organs such as the liver, spleen, and bone marrow
- Gastrointestinal (GI) lymphoma: affects the stomach and intestines
- Cutaneous lymphoma: affects the epithelial tissues of the oral cavity, skin, nose, and
- Central nervous system (CNS) lymphoma: affects the brain and/or spinal cord

In cats lymphoma typically manifests as one of the following:

- Gastrointestinal lymphoma (GI): this is the most common form of feline lymphoma
- Multicentric lymphoma
- Mediastinal lymphoma
- Central nervous system lymphoma
- Ocular lymphoma
- Renal lymphoma
- Nasal lymphoma

While location is commonly used to describe lymphoma, there are other classification schemes that are also used for both descriptive and prognostic purposes. These characteristics include tumour staging and tumour grading.

Tumour Grade

Tumour grade is often used to describe the expected biologic behaviour of a tumour.

In dogs the most common grade of lymphoma is high-grade lymphoma. High-grade lymphoma is expected to develop more quickly and behave more aggressively than indolent (low-grade) lymphoma.

In cats the term large cell lymphoma is used to refer to the equivalent high-grade lymphoma; these aggressive lymphoma cells are large and immature. The term small cell lymphoma is used to describe low-grade lymphoma, in which the cells appear indistinguishable from mature lymphocytes.

Tumour Staging

Tumour staging describes the extent of spread of a tumour.





Lymphoma is staged as follows:

- Stage 1: involvement of a single lymph node or single anatomic site
- Stage 2: involvement of lymph nodes on a single side of the diaphragm (dogs) or a resectable gastrointestinal tumour with only local lymph node involvement (cats)
- Stage 3: generalized lymph node involvement on both sides of the diaphragm (dogs) or extensive, unresectable abdominal disease (cats)
- Stage 4: involvement of the liver and/or spleen
- Stage 5: involvement of the CNS and/or bone marrow or any other organ.

CLINICAL SIGNS

The symptoms of lymphoma can vary significantly and are largely dependent on the area of the body that is affected with lymphoid proliferation.

In dogs the most common manifestation of multicentric lymphoma is generalised lymphadenopathy. Owners may notice lumps or swellings at the sites of their dog's lymph nodes, or enlarged lymph nodes may be detected during a veterinary exam. Other non specific clinical signs of multicentric lymphoma include weight loss, lethargy, pale mucous membranes, icterus, shortness of breath or exercise intolerance, increased thirst and urination.

Other canine lymphomas will present with different medical histories and clinical signs. Gastrointestinal lymphoma in dogs typically presents as vomiting, diarrhoea, and weight loss. Canine cutaneous lymphoma typically presents as a visible lesion on the mucous membrane, or on the skin, which may be ulcerative or plaque-like in appearance. Central nervous system lymphoma may lead to neurologic deficits or spinal pain.

In cats lymphoma very rarely presents as generalised lymphadenopathy. A cat with multiple enlarged lymph nodes may have a different disease process as an underlying cause, such as infection, or idiopathic lymphadenopathy.

The most common location for feline lymphoma is the gastrointestinal tract; therefore, affected cats typically present with GI signs. The most common signs of feline GI lymphoma are anorexia and weight loss, although vomiting and diarrhea may also occur. On abdominal palpation, diffuse intestinal thickening or a palpable abdominal mass may be noted; these findings may occur with both low-grade and high-grade lymphoma.

Cats with multicentric lymphoma may present for lethargy, weight loss, anorexia, and other nonspecific signs of illness. Mediastinal lymphoma may cause respiratory difficulties or shortness of breath. Central nervous system lymphoma may cause neurologic abnormalities or spinal abnormalities, while ocular lymphoma may present as visual deficits or blindness. The clinical signs of renal lymphoma are typically identical to chronic kidney disease. Nasal lymphoma typically causes sneezing, nasal discharge, and visible facial swelling.

DIAGNOSIS

Blood Tests and Imaging

The workup of a patient presenting to the veterinarian for nonspecific signs of illness, such as those seen with lymphoma, typically begins with blood tests, including a complete blood count (CBC) and serum biochemistry and urine analysis.

In many cases, the CBC of patients with lymphoma is normal. In some patients, however, CBC abnormalities may be observed. Potential CBC abnormalities in lymphoma patients include:

- Anaemia, leukopenia, or thrombocytopenia: these abnormalities may be caused by bone marrow disease or immune-mediated cell destruction
- Lymphocytosis: may represent Stage 5 disease or lymphoblastic leukaemia
- Polycythaemia: rarely associated with renal lymphoma, which results in abnormal erythropoietin production
- Neutrophilia, eosinophilia, monocytosis: associated with generalised inflammation





Serum biochemistry abnormalities are also variable, reflecting the degree of organ involvement.

- Hypercalcaemia: may occur in dogs with T cell lymphoma, associated with paraneoplastic syndrome
- Hypoglycaemia: reported in both cats and dogs
- Hyperglobulinemia: may be associated with inflammation or monoclonal antibody production
- Azotaemia: associated with renal lymphoma
- Elevated liver values: associated with hepatic involvement
- Panhypoproteinemia: associated with Gl lymphoma

Imaging in cases of suspected lymphoma may include thoracic radiographs and abdominal ultrasound to identify extent of disease if needed.

Fine Needle Aspirates

Fine needle aspirates are often taken from suspected sites of lymphoma. In the case of canine multicentric lymphoma, aspirates can be obtained from multiple lymph nodes to improve diagnostic yield. The mandibular lymph nodes should be avoided, if possible, because oral inflammation can interfere with the ability to obtain an accurate diagnosis. In feline gastrointestinal lymphoma, ultrasound guidance may permit the aspiration of a thickened region of intestine or an enlarged local lymph node.

"Under the Microscope"

In high-grade or large-cell lymphoma, cytological examination of a fine needle aspirate will typically reveal a population of immature, large lymphocytes with abundant cytoplasm that make up >70% of the cell population..

In low-grade or small-cell lymphoma, cytology typically reveals a uniform population of lymphocytes that is relatively normal in appearance. These mature lymphocytes cannot be distinguished from those associated with lymphoid

hyperplasia or inflammation.

If fine needle aspirate is not diagnostic, biopsy may be required.

Additional Diagnostics

Additional diagnostics are often recommended to confirm the diagnosis, provide valuable prognostic information, and guide treatment decisions. These diagnostics include:

- Immunocytochemistry: special stains can be used to distinguish between T cell lymphoma and B cell lymphoma in dogs- and this can be done on cytologic samples by Vetnostics
- Flow cytometry: this test can be used to assess for the presence of certain cell markers, which may provide information on diagnosis and recommended treatment protocols and prognosis
- Polymerase Chain Reaction Assay for Antigen Receptor Rearrangement (PARR): can help distinguish whether an increased lymphoid population is clonal (neoplastic) or is indicative of inflammation/hyperplasia

TREATMENT

Lymphoma is treated with chemotherapy. Specific treatment protocols vary depending on tumour location, grade, and stage.

Canine multicentric lymphoma treatment depends on the results of immunophenotyping. Canine B-cell lymphoma is typically treated with the "CHOP" protocol, which includes a combination of cyclophosphamide, vincristine, prednisolone and doxorubicin. Canine T-cell lymphoma is typically treated with the "LOPP" protocol, which includes a combination of lomustine, vincristine, procarbazine and prednisolone. In some cases, single agents or smaller combinations of drugs may be used, but these approaches are typically associated with less favourable outcomes.

Canine gastrointestinal lymphoma can be treated with a variety of chemotherapy drugs and protocols, with frequent monitoring. Multi-drug





protocols are typically recommended although single-drug therapy can be utilised.

Canine epitheliotropic T-cell lymphoma is often treated with lomustine (CCNU) and prednisolone. Radiation therapy may also be used for single or solitary lesions. Dietary supplements such as linoleic acid and retinoids may also provide some benefit in cases of cutaneous lymphoma.

Feline gastrointestinal lymphoma is typically treated with chemotherapy, using a combination of doxorubicin, cyclophosphamide, vincristine, and prednisone (CHOP) administered over 19-25 weeks.

PROGNOSIS

Like treatment protocols, prognosis also varies significantly between lymphoma types.

Canine multicentric lymphoma has an 80-90% remission rate with chemotherapy. The median survival time for B-cell lymphoma is 12-18 months, while the median survival time with T-cell lymphoma is 9-12 months.

Canine gastrointestinal lymphoma also responds relatively well to chemotherapy, with 50-70% of dogs achieving remission. Unfortunately, relapse is common and clinical improvement is short lived. Mean survival time with GI lymphoma is less than three months.

Canine epitheliotropic T-cell lymphoma may show short-term improvement with chemotherapy, but relapse is common after four to six months of treatment. Therefore, this disease median survival times range from a few months to two years.

Feline gastrointestinal lymphoma prognosis varies based upon the cat's feline leukaemia virus status. Cats with feline leukaemia have a guarded prognosis and a poor response to chemotherapy.

Cats that are negative for feline leukaemia virus have a 60% remission rate with chemotherapy and mean survival time of approximately six months. In approximately 20-30% of cases, cats may enter a complete remission that may last 18 months or longer.







CLIENT INFORMATION: FAQS ABOUT LYMPHOMA

What are the benefits of chemotherapy in the treatment of lymphoma?

The expected benefits of chemotherapy depend largely on the type of lymphoma. In general, pets diagnosed with lymphoma will live only a few weeks without treatment. Pets that receive chemotherapy for lymphoma may survive months or even years, and will also have an improved quality of life during that time.

How long will my pet live with chemotherapy?

When researching survival rates, you will often read or hear about "mean survival times." It is important to understand that mean survival times are only averages; no one can tell you how long your pet will live. Mean survival times can however, provide a very general idea of how effective a particular treatment tends to be.

Mean survival times of some common canine and feline lymphoma types, with chemotherapy:

- Canine multicentric lymphoma: 12-18 months for B-cell lymphoma, 9-12 months for T-cell lymphoma
- Canine gastrointestinal lymphoma: 3 months
- Canine epitheliotropic T-cell lymphoma: a few months to 2 years
- Feline gastrointestinal lymphoma: 6 months, but some cats respond especially well to chemotherapy and may live 18+ months

The oncologist will be able to give you a prognosis that is based on specific characteristics of your pet's disease.

What are the side effects of chemotherapy?

In general, chemotherapy is well-tolerated in veterinary patients. Veterinary chemotherapy utilizes lower doses than those used in human medicine, so side effects are typically reduced.

Side effects that you may see with chemotherapy for lymphoma include:

- Gastrointestinal signs: nausea, vomiting, loss of appetite
- Lethargy
- Thinning of the coat, or a coat that is slow to regrow when hair is clipped
- Changes in blood cell counts (which will be monitored with regular blood tests)

Less than 15% of dogs treated with chemotherapy experience significant side effects, with less than 5% of dogs requiring hospitalization for side effects. Significant side effects are similarly uncommon in cats.



CHAPTER TWO MAST CELL TUMOURS





2. MAST CELL TUMOURS

DISEASE OVERVIEW

Mast cell tumours are the most common cutaneous neoplasm of dogs, often affecting older dogs with a mean age at diagnosis of 8–9 years. Mast cell tumours are the second most common cutaneous tumour in cats, often affecting middle-aged to older cats. Their cause is unknown, although some mast cell tumours appear to be associated with genetic mutations.

Mast cell tumours are composed primarily of mast cells. These inflammatory cells contain cytoplasmic granules that are filled with histamine, heparin, proteases, growth factors, and other pro-inflammatory substances. When mast cells degranulate and release these substances they can contribute to the development of local inflammation, anaphylactoid like reactions, gastrointestinal ulceration, coagulation disorders and delayed wound healing.

CLINICAL SIGNS

Mast cell tumours can take on a wide variety of clinical appearances, which can complicate diagnosis. They are most commonly observed as solitary dermal or subcutaneous masses; they may be white, pink, or tan in colour. In some cases, affected pets may have multiple lesions.

Canine mast cell tumours are often solitary and slow-growing. Alopecia of the tumour is common, but ulceration is uncommon. Rapid growth and ulceration can occur, and are associated with aggressive behaviour. They may occur anywhere on the body.

Feline mast cell tumours are typically well-circumscribed, raised dermal masses. They also may present as discrete subcutaneous masses or flat, pruritic plaque-like lesions. Ulceration occurs more commonly in feline mast cell tumours than canine mast cell tumours. Feline mast cell tumours most commonly occur on the

head and neck, especially around the pinnae.

Swelling and inflammation may be seen around the mast cell tumour due to tumour degranulation. This may occur spontaneously, although it is often associated with manipulation and/or trauma. This can make the mass appear to wax and wane in size.

In some pets, systemic signs may occur. These are caused by the inflammatory chemicals (histamine) that are released from mast cells. Systemic signs may include vomiting, diarrhea, edema, and fever. Mast cell tumour metastasis may result in palpable lymphadenopathy or splenomegaly.

DIAGNOSIS

Blood Tests and Imaging

Blood tests in patients with a mast cell tumour is typically normal. Rarely a CBC may reveal peripheral mastocytosis; this can also be observed with other conditions and is not diagnostic for a mast cell tumour. Pets with mast cell tumours may be anaemic, due to histamine-induced GI ulceration or the anaemia of chronic disease. Serum biochemistry tests are usually normal.

Imaging is rarely helpful in the diagnosis of mast cell tumours, but may be beneficial in tumour staging and surgical planning. Thoracic radiographs can be used to evaluate for the presence of enlarged intrathoracic lymph nodes, which may occur with metastasis. Pulmonary metastasis is uncommon. Abdominal ultrasound can be used to evaluate the liver, spleen, and abdominal lymph nodes for signs of metastasis.

Fine Needle Aspirates

A diagnosis of mast cell tumour can typically be made on the basis of a fine needle aspirate. Given the clinical signs that can occur with mast cell degranulation, patients with a suspected mast cell





tumour should be pre-treated with antihistamines prior to any fine needle aspirate. For complete staging the spleen and liver need to be aspirated even when ultrasound findings are normal.

"Under the Microscope"

Mast cell tumours are small-to-medium-sized round cells with purple cytoplasmic granules and a nucleus that is not lobulated in appearance. Eosinophils may also be present on cytology obtained from a mast cell tumour.

Additional Diagnostics

Before removing a suspected mast cell tumour, the regional lymph node should be aspirated to assess for metastasis. Low numbers of mast cells can be present in a normal lymph node, but high numbers of mast cells (comprising over 3% of the total cell population observed) or sheets/rafts of mast cells can suggest metastasis.

After removal of a mast cell tumour and associated lymph node, histopathology is essential. Even if the mass was confirmed as a mast cell tumour on cytology, histopathology is necessary to establish tumour grade and determine whether adequate margins were obtained. Canine cutaneous mast cells may be graded using the Patnaik system (3 grades) or the Kiupel system (high-grade vs. low-grade), both of which provide information about prognosis and the likelihood of metastasis.

In the Patnaik System, tumours are divided into three grades:

- Grade 1: well-differentiated tumours with an estimated 5-year survival of 83%
- Grade 2: intermediately-differentiated tumours with an estimated 5-year survival of 44%
- Grade 3: poorly-differentiated tumours with an estimated 5-year survival of 6%

In the Kiupel system, tumours are divided into two grades:

- High-grade: median survival time of less than 4 months
- Low-grade: median survival time of over 2 years

Mast cell tumours from non-cutaneous sites cannot be graded using these systems. Feline mast cell tumours are not currently graded, but are instead divided into two subtypes: mastocytic (typical) and histiocytic (atypical).

TREATMENT

Surgical Removal

The first step in the treatment of a mast cell tumour is surgical removal. This removal should be performed with wide margins. These margins should extend 2–3 cm beyond the edges of the tumour and one fascial plane deep to the tumour if possible.

When manipulated, mast cell tumours may release histamine. This can lead to dramatic systemic effects, even in an anesthetised patient. Therefore, tumour manipulation should be limited during surgery. Additionally, antihistamines should be administered prior to surgical removal of a suspected mast cell tumour. Histopathology results will determine whether additional treatment is needed following tumour removal. Low-grade tumours removed with wide margins may not require any additional treatment provided there is no evidence of metastasis. For high-grade or incompletely excised mast cell tumours, additional treatment is recommended.

Radiation Therapy

If the tumour location will not permit the removal of wide margins, radiation therapy is often used. This may be used after incomplete excision or as a sole therapy for an aggressive mast cell tumour that cannot be adequately resected. In general, radiation is administered as a full course of 15–20 treatments. Regional lymph nodes may also be irradiated, either prophylactically or based on detected evidence of metastasis.

Chemotherapy

Chemotherapy may be used in pets with metastatic mast cell tumours, or when a high tumour grade suggests that metastasis is likely. Chemotherapy can be delivered orally or injectably, to play a role in preventing or delaying mast cell tumour metastasis. Chemotherapy drugs that may be used against mast





cell tumours include lomustine (CCNU), vinblastine with prednisone, and chlorambucil with prednisone. Prednisone alone may also offer palliative benefits, in situations when pet owners decline chemotherapy.

Tyrosine kinase inhibitors are a drug class that also play a valuable role in the treatment of mast cell tumours. Palladia® ,toceranib, a tyrosine kinase inhibitor registered for use in dogs. This medication can have significant benefits in the treatment of both canine and feline mast cell tumours, slowing tumour progression.

PROGNOSIS

The prognosis for mast cell tumours is largely dependent upon tumour grade, stage and whether the tumour can be excised with wide margins.

Most mast cell tumours in dogs are low grade and so can be adequately treated with local control therapies. This is especially true in Bulldogs, Boston Terriers, Boston Terriers, Pugs, and similar brachycephalic breeds. Certain locations are associated with higher rates of metastasis however these locations include the muzzle, subungual region and mucocutaneous junctions. When metastasis does occur, it typically involves local lymph nodes, then the spleen and/or liver, and bone marrow.

Canine mast cell tumours with a low mitotic index that are classified as low grade have a good prognosis, with prolonged survival times after surgical excision. Mast cell tumours with a high mitotic index (>5) or mast cell tumours that recur after surgical excision are associated with a worse prognosis.

Feline cutaneous mast cell tumours are typically associated with a favourable prognosis. Local recurrence of a feline mast cell tumour is relatively rare and metastasis is uncommon. Pleomorphic, anaplastic tumours are more clinically malignant; the prognosis for these tumours is poor and these masses may metastasize to the lymph nodes and abdomen.

Mast cell tumours can also occur as primary splenic tumours in cats and surgical resection is appropriate. Many patients experience prolonged remissions.

CLIENT INFORMATION: FAQS ABOUT MAST CELL TUMOURS

My veterinarian thinks my dog has a mast cell tumour. What's next?

If your veterinarian suspects a mast cell tumour, a fine needle aspirate will be performed to confirm the diagnosis. Your vet will pre-treat your pet with an antihistamine in order to prevent potential harmful effects that can occur when a mast cell tumour is manipulated or disrupted. Then, your veterinarian will insert a needle into the mass to collect a small sample of cells for examination under a microscope. In most cases, mast cell tumours can be easily diagnosed in this manner.

My pet has been diagnosed with a mast cell tumour. What's next?

Your veterinarian will perform a complete blood cell count and serum biochemistry, to assess your pet's overall health and internal organ function. Blood tests will also help your vet order to ensure that your pet is a good candidate for anaesthesia and surgical removal of the mass.

Your veterinarian will also aspirate the lymph nodes near your pet's mast cell tumour, to ensure that the tumour hasn't already metastasized.

If your pet is in good overall health and the tumour hasn't spread, your vet will likely schedule your pet for surgery.

Will my pet have a large incision after surgery to remove a mast cell tumour?

In most cases, yes. When a mast cell tumour is removed, veterinarians try to obtain a 3 cm margin (border) of healthy tissue all the way around the edge of the tumour.

This means that the actual area of skin that is removed is often significantly larger than the tumour itself, resulting in a large incision.





How will I care for my pet after mast cell tumour removal?

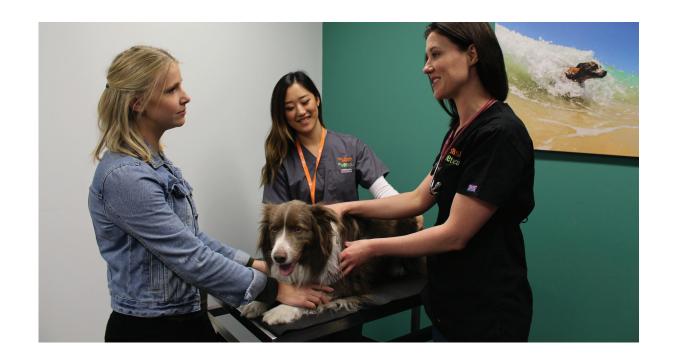
Your veterinarian will review after-care instructions with you after surgery, but you can typically expect the following:

- Your pet may be groggy after surgery as a result of anaesthesia. Feed your pet a small meal (half the size of his/her regular dinner) the night of surgery and allow your pet to rest calmly.
- Give pain medications as directed by your veterinarian.
- Ensure that your pet does not lick or chew at the incision. Your veterinarian may send home an E-collar (cone) to prevent licking or chewing.
- Keep the incision dry during healing. Do not bathe your pet or allow swimming.
- If your pet has visible skin sutures, these will likely need to be removed 7-14 days after surgery.
 (In some cases, your veterinarian may use absorbable sutures under the surface of the skin that do not require removal.)

Will my pet need additional treatment after surgery?

It will depend on the grade of the tumour and the result of surgery. Low-grade mast cell tumours typically do not need further treatment.

If your pet has an aggressive tumour, additional treatments such as chemotherapy may be recommended. If the tumour was not completely removed, additional therapy such as another surgery or radiation therapy may be recommended.





CHAPTER THREE SOFT TISSUE SARCOMA





3. SOFT TISSUE SARCOMA

DISEASE OVERVIEW

Soft tissue sarcomas comprise 15% of the skin and subcutaneous tumours seen in dogs, as well as 7% of the skin and subcutaneous tumours seen in cats. They arise from mesenchymal tissues and typically retain characteristics similar to their cell type of origin.

Examples of common soft tissue sarcomas include the following:

- Fibrosarcoma: a malignant fibroblastic tumour that arises in the skin, subcutaneous tissues, or oral cavity
- Peripheral nerve sheath tumour: a malignant, locally-invasive tumour that arises from the nerve sheath
- Liposarcoma: a malignant tumour that arises from a lipoblast, which often develops subcutaneously on the ventrum and extremities
- Leiomyosarcoma: a malignant tumour of smooth muscle, often found in the gastrointestinal tract
- Rhabdomyosarcoma: a rare malignant tumour arising from malignant myoblasts in striated muscle, often observed in the tongue, larynx, myocardium and bladder
- Haemangiosarcoma: a malignant tumour arising from vascular endothelium, often affecting the spleen, liver or right atrial appendage
- Synovial cell sarcoma: a malignant tumour of synoviocytes, often found in the joint capsule or tendon sheath
- Myxosarcoma: a tumour of uncertain fibroblast origin, which typically presents as a subcutaneous mass

Soft tissue sarcomas typically occur as solitary tumours and they are most commonly reported in middle aged and older dogs.

One notable exception is rhabdomyosarcoma, which tends to predominantly occur in young dogs.

Soft tissue sarcomas are often locally invasive and infiltrative. This makes treatment challenging as recurrence is common after attempts at removal. Fortunately, metastasis is uncommon with soft tissue sarcomas, except for those classified as high grade. In many cases, the inciting cause of a soft tissue sarcoma is unknown or unable to be determined. In dogs however, a number of possible factors have been identified that may predispose a dog to local development of a soft tissue sarcoma. These factors include radiation, trauma, foreign body (including orthopaedic implants), and internal parasites (such as Spirocerca lupi).

CLINICAL SIGNS

Many soft tissue sarcomas present as a dermal or subcutaneous mass. These masses are typically nonpainful, with normal haired skin overlying the mass.

Soft tissue sarcomas vary considerably in texture/consistency, growth rate, and the location in which they tend to develop on the body.

DIAGNOSIS

Blood Tests and Imaging

There are no CBC or serum biochemistry abnormalities that are consistently associated with soft tissue sarcomas. Hypoglycaemia has been associated with abdominal leiomyoma and leiomyosarcoma in dogs, but this is not a consistent finding. The primary benefit of baseline blood tests in pets with soft tissue sarcoma is to rule out concurrent health issues and ensure that the patient is a good candidate for anaesthesia and surgery.

If a soft tissue sarcoma is suspected, thoracic radiographs and abdominal ultrasound are typically recommended as part of staging. Although the metastatic rate for soft tissue sarcomas is low, metastasis can occur and it is important to identify





possible metastasis before beginning treatment.

Fine Needle Aspirates

Fine needle aspirate may be challenging in the case of a soft tissue sarcoma. In many cases, these masses are poorly exfoliative. A larger gauge needle and/or syringe aspiration (instead of "bare needle" technique) may improve diagnostic yield.

"Under the Microscope"

Because of the wide variation in cell types that may be seen with a soft tissue sarcoma, cytology from these specimens can be difficult to use for diagnosis in general practice. Samples are typically submitted to a pathologist for identification.

Additional Diagnostics

If cytology suggests that a mass is a soft tissue sarcoma, the next step is typically to biopsy the mass. In many cases, biopsy is the only way to achieve a diagnosis. Biopsy may be achieved with an incisional biopsy (using a biopsy punch, Tru-Cut needle, or wedge biopsy) or an excisional biopsy.

Additionally, the regional lymph node should be aspirated to assess for metastasis. This can be performed while the pet is anesthetized for biopsy of the primary tumour. Lymph node metastasis is not a common feature of soft tissue sarcoma, but can occur.

More advanced imaging may also be considered for tumour staging or surgical planning. These test may include CT and MRI.

TREATMENT

Surgical Removal

The primary treatment for any type of soft tissue sarcoma is surgical resection. Margins are important, with a minimum of 3 cm in all directions and one fascial plane depth recommended. In many cases, this may require the use of radical procedures such as amputation, body wall resection, skin flap reconstruction or mandibulectomy. An aggressive first surgery provides the most valuable opportunity for

a cure in the case of soft tissue sarcoma. In order to remove a mass with adequately wide margins, skin flaps may be required. Caudal superficial epigastric flaps, thoracodorsal axial pattern flaps, and other axial pattern flaps may be especially valuable in allowing the removal of soft tissue sarcomas with wide margins that are sufficient for a surgical cure. If radiation is being considered as an adjuvant therapy in cases where marginal resection is likely skin flaps should be avoided if possible to reduce the size of the radiation field.

If the first surgery results in incomplete margins, there are three options:

- Perform a second surgery, with the aim of obtaining wider margins
- Radiation therapy
- Chemotherapy

Radiation Therapy

Radiation therapy can offer significant benefit in the context of localized, microscopic disease. Radiation can also be used to palliate gross tumors that are not surgically resectable. In the microscopic setting, high dose fractionated protocols (e.g. 19 fractions of 3 Gy for a total dose of 57 Gy) are recommended. In selected cases a more hypofractionated protocol may be recommended. In the palliative setting hypofractionated protocols are most commonly recommended.

Chemotherapy

Chemotherapy can also be utilized for the local control of incompletely excised soft tissue sarcoma. This is achieved through the sustained release of chemotherapy drugs into a wound or body cavity. For example, cisplatin has been applied in various formulations. This allows high drug concentrations to be maintained in the local environment. In some cases, systemic chemotherapy may be beneficial. Injectable chemotherapy is most often considered in the case of high-grade soft tissue sarcomas. Injectable chemotherapy is routinely recommended for sarcomas of certain aggressive histotypes, such as hemangiosarcomas, synovial cell sarcomas, and potentially liposarcomas. Protocols utilized include single-agent doxorubicin, a combination of doxorubicin/ cyclophosphamide, and a combination of doxorubicin/





cyclophosphamide/vincristine. Metronomic chemotherapy administration has been reported as an adjuvant to delay the recurrence of marginally resected soft tissue sarcomas with some reported benefits.

PROGNOSIS

Overall, soft tissue sarcomas carry a relatively good prognosis.

Median survival times of over 3 years have been reported with treatment for low grade (I/II) tumours, and affected pets often die of causes unrelated to their tumour.

Soft tissue sarcomas are associated with a somewhat low metastatic rate (approximately 20%),

although metastatic rates of up to 40% have been observed in certain high-grade soft tissue sarcomas. High mitotic rate and tumour grade (as assessed on histopathology) are significant predictors of metastasis. When metastasis does occur it often involves the lungs and other parenchymal organs.

Prognosis is improved when the mass can be removed in a single surgery with wide surgical margins.

Even in cases with incomplete surgical excision radiation therapy is associated with an 85% likelihood of achieving a 3-year local control. In the gross setting radiation has been reported to control tumour growth for a median of 12 months when







treated with definitive protocols and 6–12 months when treated with palliative protocols.

CLIENT INFORMATION: FAQS

ABOUT SOFT TISSUE SARCOMAS

What is a soft tissue sarcoma?

The term "soft tissue sarcoma" is used to refer to a wide variety of tumours that may be seen in dogs and cats. These tumours often occur on and below the skin, although they can also occur at other sites. Soft tissue sarcomas can originate from a number of different tissue types and tend to retain characteristics that are associated with their cell type of origin.

How is soft tissue sarcoma treated?

The optimal treatment for a soft tissue sarcoma is surgery. First your vet will perform some diagnostic tests to ensure that surgery is a good option for your pet. Blood tests (including a complete blood cell count, or CBC, and serum biochemistry) will be performed to assess your pet prior to anaesthesia.

Imaging such as radiographs or ultrasound, may be performed to ensure that the tumour hasn't already metastasized. If the veterinarian determines that your pet is a candidate for surgery the mass will be removed.

Your veterinarian will aim to remove the mass with wide margins, meaning that healthy tissues surrounding the mass will also be removed. In some cases, this may require very aggressive surgery. A soft tissue sarcoma on the leg may require amputation; a soft tissue sarcoma in the mouth may require removal of part of the jaw; and even a soft tissue sarcoma of the skin may require a very large incision that will be closed through flaps of skin taken from other locations on your pet.

These wide margins are essential to ensure that the surgery is as successful as possible. Sometimes a less aggressive surgery can be performed if radiation is planned as a follow-up therapy to address any remaining microscopic cancer..

After surgery the mass will be submitted to a pathologist for microscopic evaluation. This evaluation will definitively identify the tumour type, while also providing valuable information on whether the tumour is expected to recur.

How will I care for my pet after surgery?

Your veterinarian will review your pet's specific after-care instructions with you after surgery, depending on the surgery that was performed, but you can typically expect the following:

- Your pet may be groggy after surgery, as a result of anaesthesia. Feed your pet a small meal (half the size of his/her regular dinner) the night of surgery and allow your pet to rest calmly.
- Give pain medications as directed by your veterinarian.
- Ensure that your pet does not lick or chew at the incision. Your veterinarian may send home an E-collar (cone) to prevent licking or chewing.
- Keep the incision dry during healing. Do not bathe your pet or allow swimming.
- Suture may need to be removed 10–14 days after surgery. (In some cases, your veterinarian may use absorbable sutures under the surface of the skin that do not require removal.)

Will my pet need additional treatments after surgery?

The need for additional treatments depends on what the pathologist sees under the microscope. In many cases, surgery is curative. If the mass appears very aggressive or if clean margins were not obtained, your pet may require additional treatments, such as radiation or chemotherapy.



CHAPTER FOUR OSTEOSARCOMA





4. OSTEOSARCOMA

DISEASE OVERVIEW

Osteosarcoma is the most common bone tumour of dogs, accounting for approximately 80% of canine primary bone tumours. Although osteosarcoma is less common in cats than in dogs, osteosarcoma is also the most common feline bone tumour.

In dogs, most cases of osteosarcoma occur in the long bones of middle-aged large and giant breeds. The forelimbs are affected 1.7x more often than the hindlimbs. Forelimb osteosarcoma tends to occur away from the elbow (primarily in the distal radius), while hindlimb osteosarcoma typically occurs near the stifle (in the distal femur and proximal tibia). Appendicular osteosarcoma typically presents as a single bony mass. In up to 9% of dogs however, multiple bone lesions are present at the time of diagnosis.

In cats, appendicular osteosarcoma is also the most common manifestation of osteosarcoma. In cats, the most common locations for osteosarcoma are the distal femur, proximal tibia, and proximal humerus. Cats are more likely to develop appendicular osteosarcoma in a hindlimb than a forelimb, which is a direct contrast to dogs.

In both dogs and cats, osteosarcoma can also develop in the axial skeleton. Axial osteosarcoma is less common than appendicular osteosarcoma, in both dogs and cats. Common sites for axial osteosarcoma include the skull (especially the maxilla and mandible), spine, ribs, or pelvis.

Very rarely (in less than 1% of cases), osteosarcoma can arise at extraskeletal sites. Possible sites of extraskeletal osteosarcoma include the mammary gland, subcutaneous tissues, and other sites.

CLINICAL SIGNS

Dogs with appendicular osteosarcoma typically present with lameness. In many cases, the owner attributes this lameness to trauma, which may complicate the diagnosis. The lameness associated with osteosarcoma is often intermittent in the early stages, responding well to anti-inflammatories. Over time however, the lameness tends to progress becoming more consistent and less responsive to medication. Additionally, localized swelling tends to occur at the site of osteosarcoma. This swelling may be painful on palpation.

Cats with appendicular osteosarcoma tend to present with chronic, low-grade lameness. This lameness may be present for several months before owners seek veterinary care.

In some cases, pets with appendicular osteosarcoma present for an acute onset of pronounced lameness. This may occur when a pathologic fracture of diseased bone occurs.

Axial osteosarcoma may be more challenging to diagnose than appendicular osteosarcoma, because patients do not present with lameness. Patients typically present with a swelling in the affected area, which may be painful or nonpainful in nature.





DIAGNOSIS

Blood Tests and Imaging

A CBC and serum biochemistry are recommended in any patient with suspected osteosarcoma. These tests provide information about the patient's overall health and aid in treatment planning. In most cases, pets with osteosarcoma will have normal blood tests. An elevation in alkaline phosphatase may be seen in some dogs with osteosarcoma; if it occurs, this elevation is correlated with a poor prognosis and shorter survival time.

Radiographs are often sufficient to diagnose (or at least very strongly suggest) osteosarcoma. Radiographs of the affected area typically show mixed osteolysis and osteoproliferation in the metaphysis of the long bone. Osteosarcoma can be distinguished from arthritis by the fact that it rarely crosses cartilage or crosses a joint space. With the exception of fungal disease, there are only a few radiographic differential diagnosis for osteosarcoma.

Thoracic imaging is an important component of the pre-treatment workup of osteosarcoma. Approximately 5–10% of dogs have visible metastatic lesions at the time of diagnosis and can these metastases can often be detected on thoracic radiographs. Additional tests that may be used to rule out metastasis include abdominal ultrasound, thoracic CT, and abdominal CT.

Fine Needle Aspiration

Fine needle aspiration can be sufficient to obtain a diagnosis of osteosarcoma. Radiographs or ultrasound may be used as a guide for fine needle aspirate. Some cases may be diagnosed with conventional Wright-Giemsa stains, but alkaline phosphatase can also be utilized to confirm an osteoblastic tumour origin.

"Under the Microscope"

A fine needle aspirate may reveal identifiable osteoblasts using Wright-Giemsa stains. In some cases, however, osteosarcoma may be difficult to distinguish from reactive bone.

Additional Diagnostics

A bone biopsy is the only test that can be used to definitively confirm a diagnosis of osteosarcoma. These biopsies may be obtained via an open, surgical technique or a closed technique (such as a Jamshidi bone core biopsy). Biopsies should be obtained from the center of the radiographic lesion, because peripheral samples may contain only reactive bone.

Clients should be cautioned that up to 10% of bone biopsies are non-diagnostic. Additionally, clients should be warned that a bone biopsy will increase the pet's pain for a period of several days. Finally, bone biopsies do carry a small but real risk of causing or contributing to a pathologic fracture. Some clinicians prefer to avoid these biopsy drawbacks, instead formulating a suspected diagnosis based solely on the pet's clinical presentation and radiographic findings. In these cases, histopathology may not be performed until after the mass has been surgically excised (typically via amputation).

TREATMENT

Surgical Removal

The first step in osteosarcoma treatment is local tumour control. Regardless of the long-term treatments being considered for the patient, surgical removal removes the painful tumour and will immediately improve the pet's quality of life.

Given that most cases of osteosarcoma occur in the limbs, surgical removal typically involves amputation.





While limb-sparing procedures have been attempted, by which diseased bone is resected and replaced with a bone bank allograft or a metal spacer, amputation is typically regarded as a better option and is associated with fewer surgical risks.

In dogs, surgery is not considered to be a curative treatment for osteosarcoma. Approximately 90% of dogs have microscopic metastases at the time of diagnosis, meaning that osteosarcoma will recur at a distant site following surgery.

If a dog is treated with surgery alone, the median survival time is 3–8 months. One-year survival rates of 11–21% have been reported, while the two-year survival rate of amputation alone is approximately 4%. In most cases, dogs receiving amputation alone will eventually die of pulmonary or bone metastasis. In cats, however, metastasis of osteosarcoma rare. Therefore, surgery is often curative in feline osteosarcoma.

Chemotherapy

Systemic chemotherapy is effective in dogs with osteosarcoma. It is typically used after amputation, to address metastatic disease. One-year survival rates for amputation combined with chemotherapy are 40-60%.

The most common chemotherapy drug used against osteosarcoma is carboplatin. This drug is given as an IV bolus on an outpatient basis, every 3–4 weeks for a total of six treatments. Carboplatin is typically well-tolerated; it does not cause significant gastrointestinal signs and it is not nephrotoxic in dogs.

Adriamycin may also be used against osteosarcoma, but this drug is associated with a higher risk of side effects and no measurable improvement in outcomes.

Radiation Therapy

In dogs who will not tolerate amputation (due to concurrent neurologic or orthopaedic conditions

that limit the function of their remaining limbs), palliative radiation therapy may be considered. Patients typically receive two to five radiation treatments, aimed at controlling the pain associated with osteosarcoma. Approximately 70% of treated dogs experience a reduction in pain.

The effects of radiation therapy typically last two to three months, although they may last as little as one month or as long as six months. Radiation therapy does not affect the tumour; therefore, it will continue to grow. This treatment results in a mean survival time of four to six months, with patients typically dying of metastatic disease.

PROGNOSIS

The prognosis for appendicular osteosarcoma in dogs can be fair, with aggressive treatment. While one-year survival with amputation alone is only 11–21%, these numbers improve significantly for dogs receiving chemotherapy. The median survival time for dogs receiving both surgery and chemotherapy is 12–18 months, with a two-year survival of 30% and a five-year survival of 5%.

In axial osteosarcoma in dogs, it can be more difficult to achieve complete surgical excision. Therefore, local recurrence is more common in axial osteosarcoma than in appendicular osteosarcoma. Axial osteosarcoma of the maxilla and mandible is associated with less aggressive metastatic behaviour than other types of osteosarcoma; metastatic rates of approximately 50% are observed at these locations.

The prognosis for extraskeletal osteosarcoma in dogs is poor. Mean survival times vary from one to three months, depending on the site.

Feline osteosarcoma, however, carries a better prognosis than canine osteosarcoma. While extensive local bone destruction can occur in the case of appendicular osteosarcoma, metastasis is rare. Therefore, aggressive local therapy (such as amputation) can lead to a long-term cure in feline osteosarcoma.





CLIENT INFORMATION: FAQS ABOUT OSTEOSARCOMA

How will my veterinarian diagnose osteosarcoma?

In some cases, osteosarcoma can be diagnosed on the basis of history, physical examination, and radiographic findings. More often, however, further diagnostics are required. Your veterinarian may perform either a fine needle aspirate or a bone biopsy to obtain cells from the suspected tumour for evaluation under a microscope. The results of fine needle aspirate or biopsy are typically sufficient to confirm a diagnosis of osteosarcoma.

My vet is recommending amputation of my pet's leg. How will my pet get around?

In most cases, pets do very well following limb amputation! As long as your pet does not have a significant or orthopaedic condition affecting his or her other legs, your pet can be expected to get around well on three legs.

After surgery, your pet will be discharged on pain medications to address surgical pain. You will need to limit your pet's activity until the incision heals and ensure that the incision stays clean and dry. Your pet may need to wear an e-collar to prevent licking at the incision and there may be skin sutures that need to be removed.

Your pet will likely begin walking on three legs within a day or two of surgery. Once the incision has healed, your pet can return to his or her regular activities with no restrictions.

Why does my dog need chemotherapy after removing the cancerous mass?

In the majority of cases of canine osteosarcoma (approximately 90%), the cancer has already metastasized at the time that the tumour is diagnosed. Even if no signs of metastasis are visible on radiographs or other diagnostic tests, microscopic metastases will lead to recurrence of the tumour. In most cases, osteosarcoma metastasizes to the lungs; this will result in your dog developing tumours within the lungs.

Chemotherapy addresses the microscopic metastatic disease that remains after removal of osteosarcoma. While only 11–21% of dogs survive to one year after amputation (if no other treatment is given), adding chemotherapy increases one-year survival rates to 40–60%.

Will my cat need chemotherapy after surgery for osteosarcoma?

Unlike dogs, cats rarely develop metastasis from osteosarcoma. As long as the tumour is fully removed, chemotherapy is not typically recommended in cats.

What should I expect from my dog's chemotherapy for osteosarcoma?

In most cases, the chemotherapy drug that is used to treat osteosarcoma is carboplatin. This medication is given as a relatively brief IV infusion; your dog can visit the oncologist on an outpatient basis and will not require hospitalization.

Treatments are typically given every 3–4 weeks for a total of six treatments. Between treatments, your dog will visit the veterinarian for monitoring blood tests but can otherwise live a relatively normal life. Carboplatin is well-tolerated my most dogs, with few side effects.





CHAPTER FIVE HAEMANGIOSARCOMA





5. HAEMANGIOSARCOMA

DISEASE OVERVIEW

Haemangiosarcoma is a malignant tumour that arises from the vascular endothelium, specifically bone marrow derived endothelial progenitor cells.

There are a number of distinct clinical presentations of haemangiosarcoma in dogs, including:

- Cutaneous haemangiosarcoma
- Subcutaneous/intramuscular haemangiosarcoma
- Splenic haemangiosarcoma
- Heart-based haemangiosarcoma
- Lingual haemangiosarcoma
- Bone haemangiosarcoma

These canine haemangiosarcoma presentations differ in their clinical signs, recommended treatments, and biological behaviour.

Cats can also develop haemangiosarcoma, although they do so with considerably less frequency than dogs. Feline haemangiosarcoma also has a number of distinct clinical manifestations, which include:

- Dermal haemangiosarcoma
- Subcutaneous haemangiosarcoma
- Visceral haemangiosarcoma
- Oral haemangiosarcoma

The aetiology of haemangiosarcoma, in both dogs and cats, is unknown. There is one notable exception to this however; cutaneous haemangiosarcoma is often associated with solar damage in specific breeds and dogs with behaviours that increase their exposure to UV radiation.

CLINICAL SIGNS

The signs of haemangiosarcoma vary significantly depending upon clinical presentation.

Cutaneous Haemangiosarcoma

Cutaneous haemangiosarcoma typically presents as one or more raised dermal nodules. These nodules are often red to dark purple in colour. These tumours are often associated with sun exposure; therefore, they tend to develop dogs with minimal skin pigmentation and in areas that are lacking hair, such as the abdomen, scrotum, prepuce, or distal limbs.

Subcutaneous/intramuscular Haemangiosarcoma

Subcutaneous haemangiosarcoma may be clinically indistinguishable from any other subcutaneous mass. When the mass is excised however, a dark red, bloody growth is found under the skin. These tumours are typically more invasive than the cutaneous version and require significant margins to be taken in order to be completely excised

Splenic Haemangiosarcoma

While splenic haemangiosarcoma may be detected on abdominal palpation or when screening for other diseases, it tends to remain unnoticed until it ruptures and leads to the development of a haemoabdomen. In this case, a dog typically presents with an acute onset of lethargy or collapse. Physical exam of a dog with haemoabdomen typically reveals pale mucous membranes, weak peripheral pulses, abdominal distension, and a palpable abdominal fluid wave. Petechial or ecchymotic haemorrhages may also be observed.

Heart-based Haemangiosarcoma

Heart-based haemangiosarcoma most frequently





develops in the right atrium and/or auricle of the heart. In most cases, heart-based haemangiosarcoma goes undetected until the tumour ruptures and begins to bleed, leading to pericardial effusion and cardiac tamponade.

Patients with heart-based haemangiosarcoma may present for weakness, exercise intolerance, collapse, breathing difficulty, and ascites. On physical exam, it may be difficult to auscultate the heart due to pericardial effusion. Tachycardia and an irregular heart rhythm may be observed, along with pale mucous membranes and weak peripheral pulses.

DIAGNOSIS

Blood Tests and Imaging

In most cases, blood tests on a dog with haemangiosarcoma are normal. Anaemia may be observed as a result of bleeding or as a result of chronic inflammatory disease. This anaemia is most pronounced in dogs with splenic haemangiosarcoma. Dogs with splenic haemangiosarcoma may also have abnormal circulating red blood cells, such as schistocytes, acanthocytes, and poikilocytes. Thrombocytopenia may also occur in the case of a bleeding tumour, such a splenic haemangiosarcoma or a heart-based haemangiosarcoma.

If a splenic haemangiosarcoma is suspected, abdominal radiographs or ultrasound may confirm the presence of haemoabdomen and/or the presence of a splenic mass. In cases of heart-based haemangiosarcoma, thoracic radiographs may reveal a globoid heart (consistent with pericardial effusion) and echocardiography may allow visualisation of the mass on the right atrium or auricle.

Imaging is also valuable in the staging of haemangiosarcoma, to determine the extent of its spread. Tests that may be used for the staging of haemangiosarcoma include thoracic radiographs, abdominal ultrasound, and echocardiography. A CT scan of the thorax and abdomen be used in place of radiographs and ultrasound, if desired.

Fine Needle Aspirates

Fine needle aspirates of haemangiosarcoma are typically non-diagnostic. Significant haemodilution is common, due to the vascular nature of the tumour, and therefore neoplastic cells are rarely observed. Additionally, these masses tend to bleed significantly with aspiration, making fine needle aspirate a poor choice of diagnostic tests for a suspected haemangiosarcoma.

"Under the Microscope"

Fine needle aspirate of haemangiosarcoma often reveals only red blood cells, with neoplastic cells rarely detected. If they are detected then they are large mesenchymal cells with criteria of malignancy.

Additional Diagnostics

In a dog with a haemoabdomen caused by splenic haemangiosarcoma, an abdominocentesis may reveal frank blood that does not clot. This is not diagnostic for haemangiosarcoma, as bleeding splenic tumours may also be benign.

Ultimately, the only way to diagnose haemangiosarcoma is via biopsy, which is typically obtained by tumour biopsy and histopathology. The one exception to this is a heart-based haemangiosarcoma, in which surgery may not always be feasible or reasonable for the client. In the case of heart-based haemangiosarcoma, the diagnosis is often made on the basis of imaging without obtaining a definitive diagnosis through biopsy.

TREATMENT

Cutaneous Haemangiosarcoma

Surgical excision can be curative for UV-induced cutaneous haemangiosarcoma in dogs and cats. In dogs with cutaneous haemangiosarcoma caused by solar damage however, repeated surgeries may be necessary as new tumours arise. It may be beneficial to schedule patients with recurrent cutaneous haemangiosarcoma for surgery once or twice yearly, to remove any new lesions that have arisen during that time period.





Subcutaneous Haemangiosarcoma

Like cutaneous haemangiosarcoma, the first step in addressing subcutaneous haemangiosarcoma is surgical removal of the mass. Unlike cutaneous haemangiosarcoma however, subcutaneous haemangiosarcoma is associated with a relatively high rate of invasion and metastasis. Therefore, complete staging to assess for metastatic disease and postoperative adjuvant chemotherapy is recommended.

Splenic Haemangiosarcoma

The immediate treatment of splenic haemangiosarcoma is splenectomy. This stops the bleeding and addresses the acute crisis. In most cases, it is not known at the time of splenectomy whether the splenic mass is benign or malignant. Therefore, the mass must be submitted for histopathology and further treatments are put on hold until histopathology results are received. If histopathology results indicate haemangiosarcoma, chemotherapy is recommended.

Heart-based Haemangiosarcoma

The ideal treatment of heart-based haemangiosarcoma involves removing the pericardium and as much of the tumour as possible, but this is not always a feasible option. This is a very risky procedure that is only possible if the mass is pedunculated or involving the auricle. The goal of surgery is often not to completely remove the mass, but instead to debulk it in the hopes that chemotherapy can work more effectively against microscopic disease.

If the tumour cannot be removed, the alternative surgical approach of pericardectomy may be considered. In this surgery, a small hole is created in the pericardium to prevent cardiac tamponade and right heart failure. This allows the effused blood to enter the larger pleural space, reducing clinical signs.

Radiation therapy may also be beneficial in the management of heart-based haemangiosarcoma. While large, controlled studies are lacking, it has

been used in some patients and appears to decrease the interventions needed to manage recurrent pericardial effusion.

Chemotherapy

The conventional recommended chemotherapy protocol for haemangiosarcoma involves doxorubicin, which is given every two-three weeks for a total of five treatments. Side effects associated with doxorubicin include bone marrow suppression, gastrointestinal signs, cardiac toxicity and rarely severe tissue damage with extravasation.

Newer protocols involving the use of lower doses of oral chemotherapy given on a daily basis (metronomic chemotherapy) have also been studied and may be effective.

PROGNOSIS

Haemangiosarcoma prognosis can vary widely, depending on the clinical manifestation of disease.

Cutaneous Haemangiosarcoma

In many cases, surgery is curative in cutaneous haemangiosarcoma. Approximately one-third of cases, however, will experience internal spread of disease, this is particularly common in non-predisposed breeds. Median survival times of 2–3 years are reported, although outcomes are typically better when the haemangiosarcoma is thought to be caused by solar damage. Actinic keratosis and solar elastosis are clues in the histopathology report which suggest cancer induction by UV light.

Subcutaneous/intramuscular Haemangiosarcoma

Approximately 60% of subcutaneous haemangiosarcomas have spread at the time of removal. Unfortunately, the behaviour of this cancer is similar to that of visceral haemangiosarcoma than it is to cutaneous haemangiosarcoma. Surgery alone is associated with a median survival time of approximately six months, while post-surgical chemotherapy may





improve prognosis.

Splenic Haemangiosarcoma

The median survival time with surgery alone is 4–6 weeks; only 5% of dogs will survive to 1 year without additional treatment following splenectomy. With chemotherapy, median survival time improves to 4–6 months; approximately 20% of patients are alive 1 year after surgery. The prognosis is better for dogs in which metastatic disease is not detected at the time of diagnosis.

Heart-based Haemangiosarcoma

The prognosis for heart-based haemangiosarcoma is guarded to poor. Without treatment, most patients will survive only a few weeks. Surgical tumour resection alone is associated with mean survival times of approximately six months. Chemotherapy alone, without surgery, is associated with mean survival times of 3–4 months.

CLIENT INFORMATION: FAQS ABOUT HAEMANGIOSARCOMA

My dog has had several cutaneous haemangiosarcomas removed from his skin. Can I prevent the recurrence of these tumours?

In some dogs, the repeated development of cutaneous haemangiosarcomas is related to sun exposure. Limiting your dog's sun exposure can limit the frequency with which these masses occurring. For example: Consider pet clothing to further limit sun exposure.

My veterinarian removed a splenic mass from my dog. Does this mean that my dog definitely has haemangiosarcoma?

No! While haemangiosarcoma is certainly a concern in any dog with a bleeding, splenic mass, there are a number of other conditions that can be clinically indistinguishable from haemangiosarcoma. A variety of percentages have been reported in different studies but approximately 50% of splenic masses that have

not bled or ruptured are attributable to benign causes and 50% are attributed to malignant causes (such as haemangiosarcoma and other cancers). If a splenic mass is bleeding or has ruptured the chance that it is malignant is approximately 66% and of the possible malignant diagnosis there is a 60–70% chance that the diagnosis could be haemangiosarcoma.

My veterinarian is recommending chemotherapy for my dog's haemangiosarcoma. What should I expect? Will my dog get sick?

In general, dogs tolerate chemotherapy much better than human patients. Because chemotherapy drugs attack rapidly-dividing cells. However, some side effects may occur.

Haemangiosarcoma is most commonly treated with a drug called doxorubicin. This medication is given as a slow intravenous (IV) infusion every three weeks, for a total of 5 treatments. Potential side effects of this medication include gastrointestinal effects (such as decreased appetite, vomiting, and diarrhea) and suppression of the bone marrow. If your dog develops gastrointestinal signs, talk to your veterinarian about medications that can be given to minimize these effects. Your pet's blood cell counts will be monitored during treatment to ensure that the bone marrow is functioning normally. Be sure that your dog attends all appointments recommended by your veterinarian.

Less commonly, doxorubicin can cause heart disease in certain predisposed breeds, such as Boxers, Dobermans, Dalmatians, Irish Wolfhounds, Great Danes, Saint Bernards, Newfoundlands and Cocker Spaniels. If your dog belongs to one of these breeds, or if your veterinarian is otherwise worried about the cardiac effects of doxorubicin, an echocardiogram may be recommended to assess your dog's heart before, during, and/or after chemotherapy.



CHAPTER SIX ORAL TUMOURS





6. ORAL TUMOURS

DISEASE OVERVIEW

Oral tumours comprise approximately 3% of feline neoplasms and 6–7% of canine neoplasms.

Several noted breed and sex predispositions occur in dogs. Male dogs are 2.4 times more likely to develop oropharyngeal cancer than females. The dog breeds at highest risk of oral tumours include: Cocker Spaniels, German Shepherds, German Shorthaired Pointers, Weimaraners, Golden Retrievers, Gordon Setters, Miniature Poodles, Chow Chows, and Boxers.

In dogs, the most common oral malignancy is malignant melanoma, comprising 30–40% of malignant canine oral tumours. This is followed in incidence by squamous cell carcinoma, and then by fibrosarcoma.

In cats, the most common oral malignancy is squamous cell carcinoma, followed by fibrosarcoma.

Malignant melanoma

Malignant melanoma is a common oral tumour in dogs but is uncommon in cats. This tumour most commonly occurs in older dogs. While melanoma is typically associated with a mental image of a darkly pigmented mass, nearly one third of melanoma cases are amelanotic, which means they do not contain pigment granules and so can appear as pink/unpigmented masses within the mouth. Amelanotic melanoma can be diagnosed with the use of special immunohistochemical stains performed by a pathologist.

Metastatic rates of up to 80% have been reported in canine oral melanoma. The staging system for oral tumours uses size of the primary tumour and presence/absence of local and distant spread to determine tumour stage. This system does have

its flaws however as it does not take into account variation of patient size comparative to their tumour.

Oral melanoma in dogs is staged as follows:

- Stage I: < 2 cm tumour diameter
- Stage II: 2-4 cm tumour diameter
- Stage III: 4 cm or greater tumour diameter and/ or lymph node metastasis
- Stage IV: distant metastasis

Squamous cell carcinoma

Squamous cell carcinoma is the most common oral tumour in cats and the second most common oral tumour in dogs. In cats, a number of specific risk factors have been suggested to be associated with the development of oral squamous cell carcinoma including: living in a home with a smoker, the use of over-the-counter flea collars, and the feeding of a canned diet.

Squamous cell carcinoma metastasis is rare in cats. In dogs, metastasis occurs in approximately 25% of cases. Although metastasis is relatively uncommon in both species, bone invasion is common in squamous cell carcinoma.

In dogs, squamous cell carcinoma can be located at any site within the mouth including the tongue. In cats, squamous cell carcinoma is most commonly observed along the gingiva or under the tongue.

Fibrosarcoma

Fibrosarcoma is the 2nd most common oral tumour in cats and the 3rd most common oral tumour in dogs. It is commonly found on the hard palate and maxilla. Metastasis is uncommon (occurring in less than 30% of cases), but this is a highly locally invasive tumour and therefore should be treated





aggressively.

Odontogenic tumours

These oral gingival proliferations can be difficult to distinguish from other malignant tumours in some cases. Peripheral odontogenic fibromas typically have benign behaviour and low recurrence rates following removal. Acanthomatous ameloblastomas, in contrast, are more likely to invade bone and may recur if not completely excised.

CLINICAL SIGNS

If an owner becomes aware of their pet's oral tumour, it typically is because they are able to visualize the tumour or a resulting facial deformity. Additionally, large tumours may lead to difficulty eating, excessive drooling, bleeding from the mouth and halitosis.

In many cases, however, oral tumours are only detected by the veterinarian. These masses may be detected on physical exam or, more commonly, when a pet is anesthetized for a comprehensive oral health exam and dental cleaning.

DIAGNOSIS

Blood Tests and Imaging

There are no characteristic blood test changes associated with oral tumours. Rare reports of hypercalcaemia and hypoglycaemia have occurred, but not with sufficiency frequency to suggest a definitive connection. Regardless, a CBC and serum biochemistry should be performed as part of the staging and pre-surgical workup for any pet with a malignant oral tumour.

Staging for malignant oral tumours should also include thoracic imaging, ideally with CT but 3-view chest radiographs of good quality are a suitable screening test.

Palpable lymph node enlargement only occurs in 40% of animals with oral tumours but it has been shown that up to 70% of patients have pathologic

evidence of metastasis at diagnosis. Fine needle aspirates of the mandibular and/or retropharyngeal lymph nodes is recommended as part of staging and potentially removal of these lymph nodes at the time of surgery. It may also be beneficial to ultrasound the abdomen in order to rule out metastasis to the liver, adrenals or abdominal lymph nodes.

Fine Needle Aspirates

In general, fine needle aspirates are of moderate utility in oral masses but can be difficult to obtain. Patients would require anaesthesia for an aspirate of the oral cavity.

If the patient is going to be anaesthetized, it is more practical to obtain a biopsy because this will provide more valuable information about the tumour.

Additional Diagnostics

Diagnosis of an oral tumour requires obtaining a large incisional biopsy for histopathology. This typically is performed before attempting to remove the tumour, because the results of the incisional biopsy will determine necessary margins and assist in the planning of surgical resection. Biopsies of oral tumours should always be performed from within the oral cavity, not through the lip or through the nose.

Local lymph nodes should also be aspirated anytime that a malignant tumour (especially melanoma) is suspected, even in the absence of palpable lymphadenopathy. It is important to aspirate both the ipsilateral and contralateral lymph nodes, in order to maximize the likelihood of detecting any metastatic disease.

TREATMENT

Treatment approaches for oral tumours vary, based upon tumour type and location. In general, surgical removal is the first component of treatment. After surgical resection, radiation therapy and/or chemotherapy may be recommended.





Surgical resection

The first step in the treatment of most oral tumours is surgical resection. Dental imaging or CT imaging of the tumour and its boney and soft tissue extent are often used to plan an appropriate surgical approach. This resection must be performed with 2 cm bony margins in cases of malignant cancers (melanoma, squamous cell carcinoma, and fibrosarcoma).

In many cases, removal requires a radical excision such as a maxillectomy or mandibulectomy. Following these radical excisions, many feline patients may require a feeding tube for a period of several months after surgery in order to allow healing of the oral tissues and allow them to regain normal chewing and swallowing function. Most canine patients recover very quickly from facial surgery and rarely need the placement of a feeding tube.

It is not uncommon for there to be post-operative wound breakdown and other complications due to the nature of the surgical site.

Radiation therapy

Radiation therapy may also be helpful in the treatment of oral tumours. Radiation may be performed as a primary treatment for some tumours (especially malignant melanoma and canine oral squamous cell carcinoma), while it may be used as an adjuvant to surgery in other cases (such as fibrosarcoma and feline squamous cell carcinoma).

Acute side effects of radiation may include dry and moist dermal desquamation, oral mucositis, dysphagia, conjunctivitis, and blepharitis. Late changes are less common (affecting less than 5% of patients), but may include permanent alopecia, bone necrosis, fistula formation, keratoconjunctivitis sicca, cataract formation, and retinal atrophy.

Chemotherapy

Chemotherapy can play a role in the post-

operative setting for some oral tumours or can be used as a palliative means to slow tumour progression in others. Unfortunately, oral melanoma (and melanoma in general) is largely resistant to chemotherapy, although studies reporting response rates of approximately 30% exist. For diseases such as squamous cell carcinoma, chemotherapy in the form of injectable and oral therapies have shown some success in shrinking non-surgical tumours and improving patient quality of life.

Immunotherapy

Treatment of malignant melanoma in humans has recently been revolutionised by the use of various immunotherapies that help to 'alert' the patient's immune system to the presence of their tumour in order to destroy these malignant cells. The first registered vaccine for the treatment of cancer is the ONCEPT vaccination that targets the protein tyrosinase in canine melanoma. This product has minimal side effects and has been shown in some studies to increase the disease free interval in patients after surgery. This vaccine is only available through Veterinary Oncologists.

PROGNOSIS

The prognosis for oral tumours is variable, based upon a number of factors. The following factors are associated with a more favourable prognosis in dogs: complete histopathological margins, smaller tumour diameter, tumour that is located rostral to the canine teeth. Incomplete resection, large tumour diameter, evidence of metastasis at diagnosis and location to the caudal teeth are typically associated with a worse prognosis.

Malignant melanoma

In general, the prognosis for canine malignant melanoma is guarded and depends greatly on the patients stage at diagnosis. The mean survival time with surgery alone is 6–10 months, with reported one-year survival rates of less than 35%. Radiation alone is associated with mean survival times of 8–12 months and 1-year survival of 36–48%, with a 2-year survival rate of 21%.





Survival times are correlated with stage, so smaller tumours are associated with a more favourable prognosis and larger tumours or tumour with metastasis have a more guarded prognosis *Squamous cell carcinoma*

The prognosis for canine squamous cell carcinoma is good, especially at rostral sites. After a mandibulectomy, mean survival times of 19–26 months are reported, with a 91% 1-year survival rate.

Following a maxillectomy, mean survival times of 10–19 months are reported with a 57% 1-year survival rate. This difference between mandibulectomy and maxillectomy is associated with differing rates of local recurrence.

Radiation therapy alone has a reported mean survival time of 16 months, while radiation therapy plus surgery has a median survival time of 34 months. Chemotherapy may be used in cases where owners decline surgery/radiation or in cases of metastatic or bulky disease; its precise benefits are unknown.

Squamous cell carcinoma in cats, however, has a poor prognosis with most cats surviving approximately 3 months despite the therapy chosen. One-year survival is typically less than 10%. More favourable outcomes may be observed in cats with rostral mandibular lesions, which can be addressed with mandibulectomy; survival times of up to six months have been observed in these cases. Adding radiation therapy to mandibulectomy may result in survival times of a year or more.

Fibrosarcoma

Fibrosarcoma has a guarded prognosis, because these tumours are locally aggressive. Reported mean survival times in dogs observed with surgery alone range from 11–12 months, while cats may experience disease free intervals of up to three years. Improved mean survival times may be seen when surgery is combined with postsurgical adjuvant radiation therapy; this treatment results is mean survival times of 18–26 months in dogs.

Odontogenic tumours

Odontogenic tumours are associated with a favourable prognosis. Peripheral odontogenic fibromas, in particular, have an excellent prognosis. Acanthomatous ameloblastomas may recur, especially if insufficient bone is removed surrounding the tumour. If complete removal of acanthomatous ameloblastoma is not possible they can be effectively treated with radiation therapy.

CLIENT INFORMATION: FAQS ABOUT ORAL TUMOURS

Why is my vet performing a biopsy of my pet's oral mass, instead of just removing the mass?

Biopsy is important, because it will allow your veterinarian to identify what type of oral tumour is present in your pet's mouth. While some benign oral tumours can be removed with narrow margins, other tumours require very aggressive removal (with wide margins) to fully remove the tumour. Obtaining a biopsy allows your veterinarian to plan your pet's surgery, ensuring that adequate tissues are removed without causing your pet undue pain or stress.

What should I expect after my pet's oral tumour removal?

Your pet's after-surgery care will be dependent on the type of surgery that was performed. The recovery from the removal of a small mass on the gum is entirely different from the recovery that follows the removal of a portion of a pet's jaw.

After surgery, you can expect that your pet will be sent home on pain medication and possibly antibiotics. Give these medications as directed by your veterinarian.





Feeding your pet will depend upon the extent of his or her surgery. In some cases, you may be able to feed soft food at home; in other cases, your pet may have a feeding tube placed, through which you will feed him or her during the first few weeks after surgery. Talk to your veterinarian about any concerns you may have regarding your pet's diet after surgery.

Will my pet need additional treatments after tumour removal?

That depends on your pet's diagnosis Some oral tumours can be treated with surgery alone, while other oral tumours may have a better prognosis when radiation therapy and/or chemotherapy or immunotherapy are added to surgical treatment. Your veterinarian will make the best decision for your pet, depending on your pet's tumour type and the ability to fully remove the tumour.

My veterinarian recommends radiation for my pet's oral tumour. What side effects should I expect?

Radiation side effects can be divided into two categories: acute side effects and late side effects.

Acute side effects are more common, but they resolve quickly once treatment is finished. These acute side effects may include irritation to the skin around your pet's mouth, inflammation within the mouth, trouble eating, and irritation to the eyes. Your veterinarian can help you manage these side effects if they occur.

Late radiation effects are rare, affecting less than 5% of patients that receive radiation therapy. These effects may include permanent hair loss at the side of radiation, death of the bone in the radiated area, decreased tear production, and other permanent changes within the eye.



CHAPTER SEVEN ANAL SAC ADENOCARCINOMA





7. ANAL SAC ADENOCARCINOMA

DISEASE OVERVIEW

Apocrine gland adenocarcinoma is an aggressive cancer of the anal sac. These symmetric, bilateral sacs are located between the smooth muscle of the internal anal sphincter and the skeletal muscle of the external anal sphincter. The anal sacs are lined with apocrine glands, which can give rise to anal sac adenocarcinoma.

The underlying cause of anal sac adenocarcinoma is unknown. This condition is seen in both dogs and rarely cats, with a possible genetic component in dogs. Predisposed dog breeds include Alaskan Malamutes, Cavalier King Charles Spaniels, Cocker Spaniels, Dachshunds, German Shepherds, and Golden Retrievers.

CLINICAL SIGNS

In dogs, anal gland adenocarcinoma is often an incidental finding, detected on a rectal exam that is performed as part of a routine wellness exam. Most dogs do not have observable signs of anal sac disease at the time of diagnosis.

This can make them asymptomatic and difficult to observe externally. When dogs have clinical signs that are observed by the owners, these signs are often due to regional lymph node metastasis. For example, dogs may demonstrate constipation, tenesmus, dyschezia, or pelvic limb lameness/edema. Additionally, dogs may develop paraneoplastic hypercalcaemia, which can result in polyuria, polydipsia, anorexia, vomiting, and lethargy.

The most common clinical signs observed in cats with anal sac adenocarcinoma include straining to defecate and visible swelling around the rectum. In cats, the overlying skin often becomes ulcerated with fistulous tracts, which can lead to

these masses being confused with anal sacculitis.

DIAGNOSIS

Blood Tests and Imaging

Blood tests are often recommended as a component of the pre-surgical planning for anal gland adenocarcinoma. In most cases, the CBC is normal. Serum biochemistry may reveal paraneoplastic hypercalcaemia, which is present in 20–50% of affected dogs but is rare in cats. Dogs with hypercalcaemia may also be azotemic and isosthenuric, due to the effects of hypercalcaemia on the kidneys.

A CT scan of the thorax and abdomen is recommended for staging and surgical planning.

Fine Needle Aspirates

Fine needle aspirate is often a valuable method for the diagnosis of both primary anal sac adenocarcinoma and potential metastatic lesions. This can be performed on an unsedated but restrained patient and these tumours typically exfoliate well. It can sometimes be difficult when concurrent infection is present to make a definitive diagnosis on cytology.

"Under the Microscope"

On cytology, anal sac adenocarcinoma is often visible as clusters of epithelial cells, with few distinct cytoplasmic borders. Although anal sac adenocarcinomas almost always behave malignantly, cells may have few criteria of malignancy on microscopic examination. Cells are typically uniform with a high nuclear: cytoplasmic ratio.

Additional Diagnostics





Definitive diagnosis of anal sac adenocarcinoma is based upon biopsy results. This may be obtained via incisional or excisional biopsy, depending on the tumour.

TREATMENT

Surgical resection

Surgical excision of the primary tumour is typically the first step of treatment. These tumours are often locally invasive, meaning that wide and complete margins cannot be easily obtained. Complications of anal sacculectomy include faecal incontinence (which may be temporary or permanent), wound infection or dehiscence, tenesmus, or rectocutaneous fistula formation.

The metastatic lymph nodes may also be removed at the time of surgery, especially if pre-surgical imaging has shown that the lymph nodes are enlarged. This is performed via an abdominal incision. Removal may be complicated, especially if the lymph nodes are adhered to adjacent tissues; careful dissection and undermining may be required. Risks of this procedure include hemorrhage (especially in the case of lymph nodes adjacent to large vessels) and nerve damage (which may result in urinary incontinence).

In dogs with paraneoplastic hypercalcaemia, calcium levels typically normalize after surgery. Long-term monitoring of calcium levels can be valuable in these patients, because a return of hypercalcaemia often indicates a recurrence or metastasis of the primary tumour.

Radiation therapy

Radiation therapy is often used in the treatment of anal sac adenocarcinoma. In many cases, radiation therapy is used postoperatively in the cases of incomplete removal or narrow tumour margins. Patients typically receive radiation five days per week for 4 weeks.

Radiation therapy may also be used for the treatment of enlarged internal lymph nodes or gross non-resectable primary tumours. Palliative

radiation therapy in these cases can involve four to ten treatments.

Side effects of radiation therapy at this site may include colitis, tenesmus, perineal discomfort, and skin damage. Late radiation effects are rare, but may include chronic diarrhea or tenesmus, faecal incontinence, rectal stricture, or colonic perforation.

Chemotherapy

Chemotherapy is often used in the treatment of anal sac adenocarcinoma, often as an adjuvant to surgery and/or radiation therapy. Common drugs include mitoxantrone, carboplatin and palladia. In some cases, where surgery or radiation therapy is not pursued, chemotherapy can help to shrink or stabilise the tumour and metastatic lymph nodes.

Additional Therapies

Pets with severe hypercalcaemia may benefit from treatment of the hypercalcaemia prior to surgical removal of the mass. These patients are typically treated with intravenous fluids, most commonly 0.9% sodium chloride. Furosemide may also be considered, but it should only be used in well-hydrated pets that are concurrently receiving intravenous fluids. Prednisone may also be used, as well as pamidronate.

In dogs with severe preoperative hypercalcaemia, the postoperative period may be accompanied by hypocalcaemia as the body's homeostatic mechanisms begin to normalise. These dogs may require parenteral calcium administration.

PROGNOSIS

The prognosis for anal sac adenocarcinoma is variable, depending on tumour staging, surgical margins, and the degree to which affected lymph nodes are addressed.

Approximately 80% of dogs diagnosed with anal sac adenocarcinoma already have metastasis at the time of diagnosis. Therefore, survival rates with surgery alone are poor. The reported mean survival time for patients treated with surgery alone is 6





months.

The addition of chemotherapy can increase survival times in some patients. Patients treated with surgery and chemotherapy, without radiation, experience mean survival times of 6–24 months.

The optimal treatment of anal sac adenocarcinoma is surgery, followed by radiation therapy and chemotherapy. Patients treated with a combination of surgery, radiation therapy, and chemotherapy have a mean survival time of approximately 30 months.

CLIENT INFORMATION: FAQS ABOUT ANAL SAC ADENOCARCINOMA

Why does my dog with anal sac adenocarcinoma not have any outward signs of disease?

Many dogs diagnosed with anal sac adenocarcinoma do not show outward signs of disease. These tumours are often relatively small, even in the case of aggressive, metastatic disease. Therefore, the masses are not visible externally and do not typically lead to scooting or other signs of anal gland disease. Most cases of anal sac adenocarcinoma in dogs are diagnosed on a routine wellness exam, by a veterinarian performing a rectal exam.

How did my pet develop anal sac adenocarcinoma?

The cause of anal sac adenocarcinoma is unknown. There may be a genetic predisposition, because some dog breeds are more likely to develop anal sac adenocarcinoma than other breeds. These predisposed breeds include: Alaskan Malamutes, Cavalier King Charles Spaniels, Cocker Spaniels, Dachshunds, German Shepherds, and Golden Retrievers. Realistically, however, anal sac adenocarcinoma can develop in any dog or cat breed.

What are the risks associated with surgical removal of anal sac adenocarcinoma?

Although surgical removal of anal sac tumours is necessary, it is not entirely risk-free. Your veterinarian may refer you to a surgical specialist to perform this procedure, especially if this is not a surgery that your veterinarian performs routinely.

Some pets will develop faecal incontinence after removal of an anal sac tumour, meaning that they may unconsciously drop faeces when sleeping or walking. This faecal incontinence may be temporary, resolving with time, or may be permanent.

Other complications may include infection, dehiscence (opening) of the surgical wound, or straining to defecate when having bowel movements. If your pet has hypercalcaemia (elevated blood calcium levels) before surgery, your pet may require calcium supplementation after surgery until the body's calcium levels have normalized.

Will surgery cure my pet's cancer?

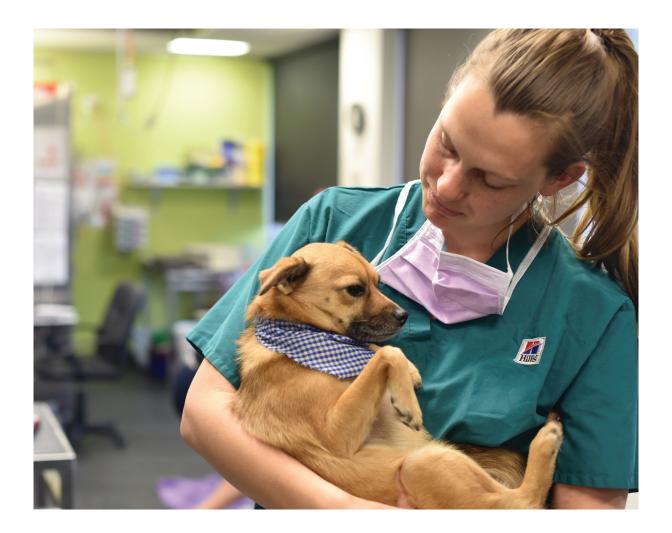
Unfortunately, surgery is not typically curative. Many pets already have metastasis at the time that their anal sac adenocarcinoma is removed. Depending on your pet's condition and the results of tumour staging and grading, your veterinarian will likely recommend radiation therapy and/or chemotherapy for your pet after surgery.

Is there anything that can be done to prevent anal sac adenocarcinoma?

Unfortunately, there are no treatments that have been shown to prevent the development of anal sac adenocarcinoma. Early detection, which requires regular veterinary exams, is the most effective way of improving treatment outcomes.









CHAPTER EIGHT CLIENT CARE





8. CLIENT CARE

This section will help you navigate the client experience, ensuring an empathetic approach for the direction ahead.

DELIVERING BAD NEWS

Delivering bad news and euthanasia can be incredibly stressful on the veterinary healthcare team, especially when this has to be done often, and when they have a close relationship with the client or companion animal. It may trigger the person delivering bad news if they have experienced something similar themselves or had an unpleasant experience with this type of conversation in the past. One tool used in human medicine carries the acronym SPIKES to support the healthcare professional in these situations. This tool is not restricted to cancer alone – telling a client their companion animal has a chronic disease, or a surgical complication has arisen, can also be included in this category.

SPIKES

Set up the discussion: mentally prepare for the conversation and make time a space. Take the client into a quiet space, or if you're on the phone, go to where you won't be interrupted. If you expect the interaction to be confrontational for you, find a support person to be close by. Sometimes just having someone close by while you're on the phone can helpful.

Ascertain the Perception of the client: Ask the client how they're feeling and what they are expecting. Prepare them that you have some news that may be hard to hear. If you have called them, make sure they are in a place to hear you e.g. pull over if they are driving.

Invite the client's permission: ask the client if you can tell them the results or news. Asking

permission to share allows the other person to really hear what you are saying as they have allowed you to talk. The caveat is that occasionally you'll have someone that says no, they're not ready, and it's important to respect that answer.

Share your **K**nowledge: tell the client the results and bad news

Emotion and Empathy: empathise with the client during their responses.

Summary and Strategy: summarise what you have said, summarise what they have said and move onto next steps.

Core communication skills to employ during the euthanasia discussion include:

- Empathy: this is where you are walking in your clients shoes and can acknowledge that the euthanasia decision is such a difficult one.
- · Reflective listening: this allows the client to feel heard, and correct you if you reflect something back and that's not quite what they meant.

Normalising and validation: letting the client know whatever they feel is normal, and what they're feeling is right for them at this time can decrease anxiety.

Clients are concerned about making the decision too soon or too late and for some this will represent their first significant loss in their life. It is helpful to remain curious as to the client's decision and approach the situation with as little judgment as possible. Euthanasia has the ultimate side effect and there is no going back. Clients can experience severe grief when they lose a pet – acknowledging this and normalising this for them will make for a better communication outcome





DISCUSSING EUTHANASIA

In many oncology cases, the eventual outcome might be euthanasia. Euthanasia may occur within a short timeframe if a client declines recommended treatment or a cancer is highly aggressive, or euthanasia may occur years down the road. Regardless, a discussion regarding euthanasia is likely to happen at some point.

In order to introduce the topic of euthanasia, it can be helpful to discuss quality of life scales. A number of different quality of life scales are available, but all of these share the goal of helping owners evaluate their pet's quality of life with some degree of objectivity. This can help in determining appropriate timing for euthanasia. Additionally, quality of life scales can be very helpful for clients who are hesitant to euthanize, even in the face of a poor prognosis.

Once a client has elected euthanasia, involve the client in the planning process as much as possible. Some clients may opt to stay in the room with their pet, while others would prefer to leave and remember their pet is still alive. Some clients may want to bring friends and family to their pet's euthanasia, while others prefer to be alone.

Give the client details about the euthanasia process. If a client has recently experienced a euthanasia with another pet, this may not be necessary. In most cases, however, it helps for clients to know what to expect. Describe your practice's euthanasia procedures: whether an intravenous catheter will be placed, whether pre-euthanasia sedation is administered, etc. Additionally, caution owners about the other realities of euthanasia: the pet's eyes will remain open, the pet may lose bladder or bowel control, etc. Having this information can help clients be more prepared and avoid surprises on the day of euthanasia.

FREQUENTLY ASKED QUESTIONS

RADIATION SIDE EFFECTS

Why is my pet losing hair at the radiation site? What should I do?

Hair loss and skin reactions at the radiated sites are normal. In most cases, these changes are only temporary. Use an e-collar (cone) to prevent self-trauma to irritated skin and schedule an examination to determine whether additional treatment is necessary.

My pet's mouth is sore after radiation treatments. What can I do to help?

Radiation to the mouth may cause discomfort and decreased saliva production, which may make it difficult for your pet to eat. Try offering a tasty, warmed, soft food. Pain medication can be prescribed if necessary. The good news is that your pet's discomfort should resolve within a few weeks.

Why are my pet's eyes inflamed after radiation therapy?

Short-term effects of radiation near the eyes may include redness, itching, discharge, and decreased tear production. If your pet's eyes are uncomfortable, apply an e-collar to prevent self-trauma and schedule a veterinary appointment as soon as possible. Your pet may need medication to address the effects of radiation on his or her eyes.

My pet's neurologic signs seemed to improve after radiation of a brain tumour, but now the neurologic signs are returning. What's happening?

Brain radiation may cause delayed signs associated with the inflammation triggered by radiation. In this case, you might see worsening of your pet's neurologic signs. Typically, these changes can be treated with steroids, which decrease inflammation within the brain.





If your pet doesn't improve with steroid treatment, the next step would be to repeat diagnostics to ensure that the initial tumour has not recurred.

Does my pet emit radiation after treatments?

No. Once the linear accelerator has been turned off, there is no residual radiation that remains within your pet. You are free to cuddle and snuggle your pet as you normally would.

HANDLING CHEMOTHERAPY MEDICATIONS AT HOME

In some cases, clients may be sent home with chemotherapy medications to administer orally. These medications have the potential to cause damage to healthy cells in both pets and humans, so it is important that clients be instructed to handle these drugs with correct personal protective equipment (PPE) Pregnant and nursing women and small children are at the highest risk of effects from handling chemotherapy agents and should not be handling them or the wastes from pets on chemotherapy.

Chemotherapy drugs are not only found within the tablets or capsules themselves, but also within the blood, saliva, urine and faeces of pets undergoing treatment. Therefore, it's important to handle the excrement of treated pets with correct PPE during chemotherapy.

While the oncologist will review this information with the client, here are the answers to some commonly-asked questions about oral chemotherapy.

How do I administer chemotherapy medications at home?

Follow these steps to administer your pet's chemotherapy medications at home:

- Read the instructions thoroughly.
- Wear gloves.
- Administer the medication in an area where the surface is easy to clean and away from food preparation areas.

- If possible, place the medication at the back of your pet's throat and encourage him or her to swallow. If that is unsuccessful, you can place the tablet in a small amount of a soft treat (such as cheese, peanut butter, or canned food).
- Used gloves and empty medication bottles should be returned to the oncologist for safe disposal.
- Contact the oncologist if you have difficulty administering medications.

How do I clean up after a medication spill (or a urine/faeces accident)?

If a chemotherapy drug is spilled at home (or your pet has an accident within 48 hours of receiving medication), the area should be considered contaminated and it should be cleaned promptly.

Use the following technique for cleaning spills:

- Wear gloves.
- Use a dilute bleach-soaked paper towel or cloth to clean up the spilled medication.
- Work in a circular fashion, from the outside in to the center, to avoid further spreading the medication on your floors or countertops.
- Throw away contaminated cloth or paper towels, placing them in a separate waste bag that is the double-bagged in a second waste bag. This can be disposed of in the outside garbage container.

If your pet has spat out or vomited the medication, do not attempt to repeat dosing. There is no way to know how much of the medication your pet may have ingested/absorbed and you do not want to overdose your pet. Contact the oncology department for instructions on what to do in this situation.

If contamination of your pet's bedding occurs, the bedding should be handled with gloves. Be careful to avoid dripping urine through your home on the way to the laundry room. Soiled bedding should be washed twice (first with cold water, then with warm water) with regular laundry detergent. After this washing, the bedding is considered safe to





handle without any special precautions.

Can I still interact with my pet while they are receiving chemotherapy?

There is no known safe amount of chemotherapy for us to be exposed to. There is a small amount of chemotherapy found in urine, saliva and faeces, up to 21 days after chemotherapy is administered. For this reason you should avoid contact with urine, saliva and faeces from pets on chemotherapy and wash the area thoroughly if you come into contact with these wastes.

LYMPHOMA

What are the benefits of chemotherapy in the treatment of lymphoma?

The expected benefits of chemotherapy depend largely on the type of lymphoma. In general pets diagnosed with lymphoma will live only a few weeks without treatment. Pets that receive chemotherapy for lymphoma may survive months or even years and will also have an improved quality of life during that time.

How long will my pet live with chemotherapy?

When researching survival rates, you will often read or hear about "mean survival times." It is important to understand that mean survival times are only averages, no one can tell you how long your pet will live. Mean survival times can however, provide a very general idea of how effective a particular treatment tends to be.

Mean survival times of some common canine and feline lymphoma types, with chemotherapy:

- Canine multicentric lymphoma: 12–18 months for B-cell lymphoma, 9–12 months for T-cell lymphoma
- Canine gastrointestinal lymphoma: 3 months
- Canine epitheliotropic T-cell lymphoma: a few months to 2 years
- Feline gastrointestinal lymphoma: 6 months, but some cats respond especially well to chemotherapy and may live 18+ months

The oncologist may be able to give you a prognosis that is based on specific characteristics of your pet's disease.

What are the side effects of chemotherapy?

In general chemotherapy is well-tolerated in veterinary patients. Veterinary chemotherapy utilizes lower doses than those used in human medicine so side effects are typically reduced.

Side effects that you may see with chemotherapy for lymphoma include:

- Gastrointestinal signs: nausea, vomiting, loss of appetite
- Lethargy
- Thinning of the coat, or a coat that is slow to regrow when hair is clipped
- Changes in blood cell counts (which will be monitored with regular blood tests)

Less than 15% of dogs treated with chemotherapy experience significant side effects. Less than 5% of dogs require hospitalization for side effects. Significant side effects are similarly uncommon in cats.

MAST CELL TUMOURS

My veterinarian thinks my dog has a mast cell tumour. What's next?

If your veterinarian suspects a mast cell tumour a fine needle aspirate will be performed to confirm the diagnosis. Your vet will pre-treat your pet with an antihistamine in order to prevent potential harmful effects that can occur when a mast cell tumour is manipulated or disrupted. Then, your veterinarian will insert a needle into the mass to collect a small sample of cells for examination under a microscope. In most cases, mast cell tumours can be easily diagnosed in this manner.





My pet has been diagnosed with a mast cell tumour. What's next?

Your veterinarian will perform a complete blood cell count and serum biochemistry, to assess your pet's overall health and internal organ function. Blood tests will also help your vet order to ensure that your pet is a good candidate for anaesthesia and surgical removal of the mass. Your veterinarian will also aspirate the lymph nodes near your pet's mast cell tumour, to ensure that the tumour hasn't already metastasized. If your pet is in good overall health and the tumour hasn't spread, your vet will likely schedule your pet for surgery.

Will my pet have a large incision after surgery to remove a mast cell tumour?

In most cases yes. When a mast cell tumour is removed veterinarians try to obtain a 3 cm margin (border) of healthy tissue all the way around the edge of the tumour. This means that the actual area of skin that is removed is often significantly larger than the tumour itself, resulting in a large incision.

How will I care for my pet after mast cell tumour removal?

Your veterinarian will review after-care instructions with you after surgery, but you can typically expect the following:

- Your pet may be groggy after surgery as a result of anaesthesia. Feed your pet a small meal (half the size of his/her regular dinner) the night of surgery and allow your pet to rest calmly.
- Give pain medications as directed by your veterinarian.
- Ensure that your pet does not lick or chew at the incision. Your veterinarian may send home an E-collar (cone) to prevent licking or chewing.
- Keep the incision dry during healing. Do not bathe your pet or allow swimming.
- If your pet has visible skin sutures, these will likely need to be removed 7-14 days after surgery. (In some cases, your veterinarian may use absorbable sutures under the surface of the skin that do not require removal.)

Will my pet need additional treatment after surgery?

It will depend on the grade of the tumour and the result of surgery. Low-grade mast cell tumours typically do not need further treatment. If your pet has an aggressive tumour, additional treatments such as chemotherapy may be recommended. If the tumour was not completely removed, additional therapy such as radiation therapy may be recommended.

SOFT TISSUE SARCOMAS

What is a soft tissue sarcoma?

The term "soft tissue sarcoma" is used to refer to a wide variety of tumours that may be seen in dogs and cats. These tumours often occur on and below the skin, although they can also occur at other sites. Soft tissue sarcomas can originate from a number of different tissue types and tend to retain characteristics that are associated with their cell type of origin.

How is soft tissue sarcoma treated?

The optimal treatment for a soft tissue sarcoma is surgery. First your vet will perform some diagnostic tests to ensure that surgery is a good option for your pet. Blood test (including a complete blood cell count, or CBC, and serum biochemistry) will be performed to assess your pet prior to anaesthesia. Imaging, such as radiographs or ultrasound, may be performed to ensure that the tumour hasn't already metastasized.

If the veterinarian determines that your pet is a candidate for surgery, the mass will be removed. Your veterinarian will try to remove the mass with wide margins, meaning that healthy tissues surrounding the mass will also be removed. In some cases, this may require very aggressive surgery. A soft tissue sarcoma on the leg may require amputation; a soft tissue sarcoma in the mouth may require removal of part of the jaw; and even a soft tissue sarcoma of the skin may require a very large incision that will be closed through flaps of skin taken from other locations on your





pet.

These wide margins are essential to ensure that the surgery is as successful as possible. Sometimes a less aggressive surgery can be performed if radiation is planned as a follow-up therapy to address any remaining microscopic cancer.

After surgery, the mass will be submitted to a pathologist for microscopic evaluation. This evaluation will definitively identify the tumour type, while also providing valuable information on whether the tumour is expected to recur.

How will I care for my pet after surgery?

Your veterinarian will review your pet's specific after-care instructions with you after surgery, depending on the surgery that was performed, but you can typically expect the following:

- Your pet may be groggy after surgery, as a result of anaesthesia. Feed your pet a small meal (half the size of his/her regular dinner) the night of surgery and allow your pet to rest calmly.
- Give pain medications as directed by your veterinarian.
- Ensure that your pet does not lick or chew at the incision. Your veterinarian may send home an E-collar (cone) to prevent licking or chewing.
- Keep the incision dry during healing. Do not bathe your pet or allow swimming.
- Suture may need to be removed 10–14 days after surgery. (In some cases, your veterinarian may use absorbable sutures under the surface of the skin that do not require removal.)

Will my pet need additional treatments after surgery?

The need for additional treatments depends on what the pathologist sees under the microscope. In many cases, surgery is curative. If the mass appears very aggressive or if clean margins were not obtained, your pet may require additional treatments, such as radiation or chemotherapy.

OSTEOSARCOMA

How will my veterinarian diagnose osteosarcoma?

In some cases, osteosarcoma can be diagnosed on the basis of history, physical examination, and radiographic findings. More often, however, further diagnostics are required. Your veterinarian may perform either a fine needle aspirate or a bone biopsy to obtain cells from the suspected tumour for evaluation under a microscope. The results of fine needle aspirate or biopsy are typically sufficient to confirm a diagnosis of osteosarcoma.

My vet is recommending amputation of my pet's leg. How will my pet get around?

In most cases, pets do very well following limb amputation! As long as your pet does not have a significant or orthopaedic condition affecting his or her other legs, your pet can be expected to get around well on three legs.

After surgery, your pet will be discharged on pain medications to address surgical pain. You will need to limit your pet's activity until the incision heals and ensure that the incision stays clean and dry. Your pet may need to wear an e-collar to prevent licking at the incision and there may be skin sutures that need to be removed.

Your pet will likely begin walking on three legs within a day or two of surgery. Once the incision has healed, your pet can return to his or her regular activities with no restrictions.

Why does my dog need chemotherapy after removing the cancerous mass?

In the majority of cases of canine osteosarcoma (approximately 90%), the cancer has already metastasized at the time that the tumour is diagnosed. Even if no signs of metastasis are visible on radiographs or other diagnostic tests, microscopic metastases will lead to recurrence of the tumour. In most cases, osteosarcoma metastasizes to the lungs; this will result in your





dog developing tumours within the lungs.

Chemotherapy addresses the microscopic metastatic disease that remains after removal of osteosarcoma. While only 11–21% of dogs survive to one year after amputation (if no other treatment is given), adding chemotherapy increases one-year survival rates to 40–60%.

Will my cat need chemotherapy after surgery for osteosarcoma?

Unlike dogs, cats rarely develop metastasis from osteosarcoma. As long as the tumour is fully removed, chemotherapy is not typically recommended in cats.

What should I expect from my dog's chemotherapy for osteosarcoma?

In most cases, the chemotherapy drug that is used to treat osteosarcoma is carboplatin. This medication is given as a relatively brief IV infusion; your dog can visit the oncologist on an outpatient basis and will not require hospitalization.

Treatments are typically given every 3–4 weeks for a total of six treatments. Between treatments, your dog will visit the veterinarian for monitoring blood tests but can otherwise live a relatively normal life. Carboplatin is well-tolerated my most dogs, with few side effects.

HAEMANGIOSARCOMA

My dog has had several cutaneous haemangiosarcomas removed from his skin. Can I prevent the recurrence of these tumours?

In some dogs, the repeated development of cutaneous haemangiosarcomas is related to sun exposure. Limiting your dog's sun exposure can limit the frequency with which these masses occurring. For example: Consider pet clothing to further limit sun exposure.

My veterinarian removed a splenic mass from my dog. Does this mean that my dog definitely has haemangiosarcoma?

No! While haemangiosarcoma is certainly a concern in any dog with a bleeding, splenic mass, there are a number of other conditions that can be clinically indistinguishable from haemangiosarcoma. A variety of percentages have been reported in different studies, but approximately 50% of splenic masses that have not bled or ruptured are attributable to benign causes and 50% are attributed to malignant causes (such as haemangiosarcoma and other cancers). If a splenic mass is bleeding or has ruptured the chance that it is malignant is approximately 66% and of the possible malignant diagnosis there is a 60–70% chance that the diagnosis could be haemangiosarcoma.

My veterinarian is recommending chemotherapy for my dog's haemangiosarcoma. What should I expect? Will my dog get sick?

In general, dogs tolerate chemotherapy much better than human patients. Because chemotherapy drugs attack rapidly-dividing cells, however, some side effects may occur.

Haemangiosarcoma is most commonly treated with a drug called doxorubicin. This medication is given as a slow intravenous (IV) infusion every three weeks, for a total of 5 treatments. Potential side effects of this medication include gastrointestinal effects (such as decreased appetite, vomiting, and diarrhea) and suppression of the bone marrow. If your dog develops gastrointestinal signs, talk to your veterinarian about medications that can be given to minimize these effects. Your pet's blood cell counts will be monitored during treatment, to ensure that the bone marrow is functioning normally. Be sure that your dog attends all appointments recommended by your veterinarian.

Less commonly, doxorubicin can cause heart disease in certain predisposed breeds, such as Boxers, Dobermans, Dalmatians, Irish Wolfhounds, Great Danes, Saint Bernards, Newfoundlands and Cocker Spaniels. If your dog belongs to one of these breeds, or if your veterinarian is otherwise worried about the cardiac effects of doxorubicin, an echocardiogram may be recommended to assess your dog's heart before, during, and/or after chemotherapy.





ORAL TUMOURS

Why is my vet performing a biopsy of my pet's oral mass, instead of just removing the mass?

Biopsy is important, because it will allow your veterinarian to identify what type of oral tumour is present in your pet's mouth. While some benign oral tumours can be removed with narrow margins, other tumours require very aggressive removal (with wide margins) to fully remove the tumour. Obtaining a biopsy allows your veterinarian to plan your pet's surgery, ensuring that adequate tissues are removed without causing your pet undue pain or stress.

What should I expect after my pet's oral tumour removal?

Your pet's after-surgery care will be dependent on the type of surgery that was performed. The recovery from the removal of a small mass on the gum is entirely different from the recovery that follows the removal of a portion of a pet's jaw.

After surgery, you can expect that your pet will be sent home on pain medication and, possibly, antibiotics. Give these medications as directed by your veterinarian.

Feeding your pet will depend upon the extent of his or her surgery. In some cases, you may be able to feed soft food at home; in other cases, your pet may have a feeding tube placed, through which you will feed him or her during the first few weeks after surgery. Talk to your veterinarian about any concerns you may have regarding your pet's diet after surgery.

Will my pet need additional treatments after tumour removal?

That depends on your pet's diagnosis Some oral tumours can be treated with surgery alone, while other oral tumours may have a better prognosis when radiation therapy and/or chemotherapy or immunotherapy are added to surgical treatment. Your veterinarian will make the best decision for your pet, depending on your pet's tumour type and the ability to fully remove the tumour.

My veterinarian recommends radiation for my pet's oral tumour. What side effects should I expect?

Radiation side effects can be divided into two categories: acute side effects and late side effects. Acute side effects are more common, but they resolve quickly once treatment is finished. These acute side effects may include irritation to the skin around your pet's mouth, inflammation within the mouth, trouble eating, and irritation to the eyes. Your veterinarian can help you manage these side effects, if they occur.

Late radiation effects are rare, affecting less than 5% of patients that receive radiation therapy. These effects may include permanent hair loss at the side of radiation, death of the bone in the radiated area, decreased tear production, and other permanent changes within the eye.

ANAL SAC ADENOCARCINOMA

Why does my dog with anal sac adenocarcinoma not have any outward signs of disease?

Many dogs diagnosed with anal sac adenocarcinoma do not show outward signs of disease. These tumours are often relatively small, even in the case of aggressive, metastatic disease. Therefore, the masses are not visible externally and do not typically lead to scooting or other signs of anal gland disease. Most cases of anal sac adenocarcinoma in dogs are diagnosed on a routine wellness exam, by a veterinarian performing a rectal exam.

How did my pet develop anal sac adenocarcinoma?

The cause of anal sac adenocarcinoma is unknown. There may be a genetic predisposition, because some dog breeds are more likely to develop anal sac adenocarcinoma than other breeds. These predisposed breeds include: Alaskan Malamutes, , Cavalier King Charles Spaniels, Cocker Spaniels, Dachshunds, German Shepherds, and Golden Retrievers. Realistically, however, anal sac adenocarcinoma can develop in any dog or cat breed.





What are the risks associated with surgical removal of anal sac adenocarcinoma?

Although surgical removal of anal sac tumours is necessary, it is not entirely risk-free. Your veterinarian may refer you to a surgical specialist to perform this procedure, especially if this is not a surgery that your veterinarian performs routinely.

Some pets will develop faecal incontinence after removal of an anal sac tumour, meaning that they may unconsciously drop faeces when sleeping or walking. This faecal incontinence may be temporary, resolving with time, or may be permanent.

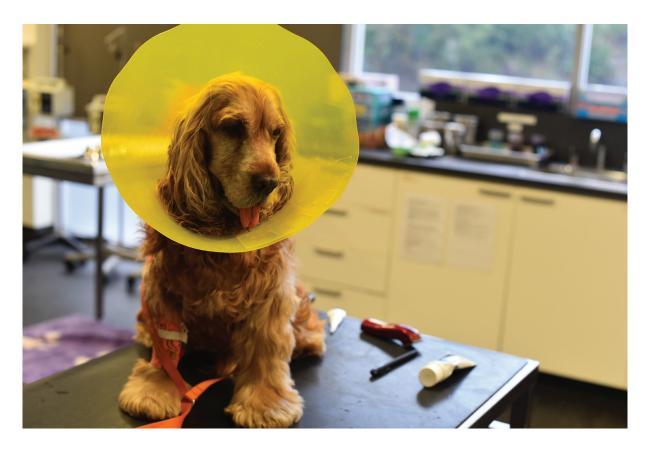
Other complications may include infection, dehiscence (opening) of the surgical wound, or straining to defecate when having bowel movements. If your pet has hypercalcaemia (elevated blood calcium levels) before surgery, your pet may require calcium supplementation after surgery until the body's calcium levels have normalized.

Will surgery cure my pet's cancer?

Unfortunately, surgery is not typically curative. Many pets already have metastasis at the time that their anal sac adenocarcinoma is removed. Depending on your pet's condition and the results of tumour staging and grading, your veterinarian will likely recommend radiation therapy and/or chemotherapy for your pet after surgery.

Is there anything that can be done to prevent anal sac adenocarcinoma?

Unfortunately, there are no treatments that have been shown to prevent the development of anal sac adenocarcinoma. Early detection, which requires regular veterinary exams, is the most effective way of improving treatment outcomes.





For more information please visit

www.sashvets.com

Alternatively, you can email us at cancercare@sashvets.com or call our helpful Animal Cancer Centre team on

(02) 9889 0289 Sydney

(02) 4311 1311 Central Coast

