Common Tumors of the Skin and Subcutis

The following abbreviations will be used throughout the lecture:

- **aCA**: adenocarcinoma
- **BCT**: basal cell tumor
- **CGA**: ceruminous gland adenoma/adenocarcinoma
- **FSA**: fibrosarcoma
- **HCT**: histiocytoma
- **HPA**: hemangiopericytoma
- **LI**: lipoma
- **MCT**: mast cell tumor
- **MH**: malignant histiocytosis
- **MM**: malignant melanoma
- **PCT**: plasma cell tumor
- **NST**: nerve sheath tumor (neurofibroma, neurofibrosarcoma, schwannoma)
- **PA**: perianal adenoma/adenocarcinoma
- **SA**: sebaceous adenoma
- **SCC**: squamous cell carcinoma

Tumors of the skin and subcutaneous tissues are frequently encountered by practitioners, since they have a very high prevalence and are easily detected by the owners. Benign skin tumors are more common in dogs and malignant skin tumors (and non-neoplastic skin conditions) are more common in cats. Using a simple, logical, step-by-step approach facilitates the diagnosis and treatment of these patients and oftentimes avoids a second therapeutic procedure.

**General Principles of Diagnosis**

Diagnosis and characterization of a skin mass prior to definitive surgical excision is important for several reasons. Knowledge of the tumor type allows the clinician to plan an appropriate surgical approach (eg, in a MCT that requires wide margins in order to obtain complete excision), to consider radiation therapy (eg, nonresectable carcinomas), or to institute medical treatment (eg, vincristine chemotherapy for TVTs or combination chemotherapy for cutaneous LSA or malignant histiocytic disorders).

In dogs, mere inspection of the patient facilitates narrowing down the list of differential diagnoses, since some tumor types occur preferentially in certain anatomic locations (Table 1). As is often the case in cats (i.e. they don’t follow “dog” rules), most common tumors occur preferentially on the head and neck (i.e.; SCC, MCT, BCT).

Palpation of the mass allows distinction of the layer of origin. Masses that move with the skin are referred to as dermoeipidermal, whereas if the skin freely moves on top of the mass, it is subcutaneous or deep (Table 2).

To detect the presence of metastatic disease prior to surgery, regional lymph nodes should be evaluated cytologically (fine needle aspiration-see below) or histopathologically. In the past the recommendation was to aspirate only enlarged regional lymph nodes; however, because metastatic MMs and MCTs can be present in nodes of normal size, we now recommend aspirating the regional nodes, regardless of whether they are enlarged or not. Additionally, lymph node excisional biopsy may be done at surgery for more accurate staging. Thoracic radiographs (3 views) should be obtained to detect potential pulmonary metastases; the exeception to the rule are MCTs, tumors that virtually never
metastasize to the lungs. Abdominal radiographs and/or ultrasonography should be performed in those cases where dissemination to the abdominal organs or cavity (or multicentricity) is suspected (eg, MCT, HSA, LSA).

**Fine needle aspiration**

Sample collection and evaluation of fine needle aspirates of skin masses will be briefly discussed during the lecture, and is beyond the scope of this article. Briefly, skin tumors can be classified as epithelial, mesenchymal (spindle cell tumors), or round cell tumors (Table 3).

**Biopsy**

Incisional or excisional biopsies can be performed to obtain a definitive diagnosis (if cytology failed to yield a diagnostic sample) or to appropriately grade a tumor. Incisional biopsies can be obtained using either a skin biopsy punch, a Tru-Cut-style needle, or a scalpel.

Punch biopsies are relatively simple, and are commonly used to obtain a sample of superficial (dermoepidermal) masses; they can be done using only local anesthetic and take very little time. Tru-Cut-type needle biopsies can be utilized to obtain representative sample of larger or subcutaneous masses, also using only local anesthesia. A routine surgical procedure is used to obtain a "wedge" biopsy.

In an excisional biopsy all or most of the tumor or mass is removed and submitted for histopathologic examination. This is indicated for small, easily excisable masses, but is contraindicated for larger masses. Surgical margins of at least one centimeter should be obtained. All the masses excised should be properly fixed (1 part of sample in 9 parts of 10% buffered formalin); if there are multiple tumors, each one should be properly labeled to determine their location. All tumors should be sent to a qualified veterinary pathologist for examination.

**General Principles of Therapy**

As a general rule, the vast majority of skin tumors are treated (and frequently cured) by surgical excision. However, proper planning prior to the surgery will maximize the effectiveness of this technique. As discussed above, knowing the tumor type beforehand (after doing cytologic or histopathologic evaluation of the mass), allows for proper “dose” of surgery to be “dispensed” (ie; “low-dose” for benign tumors; “high-dose” for malignant tumors).

Radiosensitive tumors include: LSA, TVT, MCT, MH, HCT, PA, SGA. Chemotherapy is effective in dogs with LSA, HSA, PCT, some MCT, some soft tissue sarcomas, and few carcinomas.

**Selected Tumor Types**

**Mast cell tumors**

Cutaneous MCTs are very common in the dog and common in the cat. Complete surgical excision is curative in most dogs with grades 1 and 2 MCTs, whereas it is rarely curative in dogs with grade 3 MCTs. Early studies reported that approximately 50-60% of dogs with grade 2 MCTs treated with surgery alone lived more than a month. However, it was recently demonstrated that if a complete excision of a grade 2 MCT is achieved during the first surgery, or if a second, more aggressive surgery is performed within two weeks of the original
incomplete excision, >80% of the patients live more than a year. Moreover, the local recurrence rate of completely excised grade 2 MCTs is approximately 10%.

Therefore, although radiation therapy was considered the gold-standard for treatment of incompletely resected grade 2 MCTs, a second surgery within 2 weeks of the first one gives very similar results, with only one additional anesthetic episode (as opposed to 10 to 19), lower cost, and negligible toxicity.

A new approach to dogs with incompletely excised grade 2 MCTs in which a second complete resection is unlikely to be obtained (e.g.; perineal, head, or limb locations) is to administer a 3- to 6-month course of lomustine (CCNU), with or without prednisone, at a dosage of 60-90 mg/m², PO, every 3 weeks. Our preliminary results indicate that this approach is comparable to radiotherapy in terms of disease-free interval and median survival times.

Dogs with nonresectable or metastatic MCTs benefit from chemotherapy with lomustine, with or without corticosteroids (REF). We currently use the dose of lomustine cited above, with or without prednisone, 1-4 mg/kg q24 to q48h and/or vinblastine (2 mg/m², IV, q2-4 wks). Because extensive MCTs can result in hyperhistaminemia and secondary gastroduodenal ulceration, we perform a test for fecal occult blood, and if positive, we treat the patient with sucralfate (1 gm/20 kg, PO, q8h) and an H₂ antihistamine at conventional doses (I use famotidine, at 0.5-1 mg/kg, PO, q24h). Proton-pump inhibitors can be used instead of H₂ antihistamines. Tyrosine kinase inhibitors (TKIs), such as toceranib and masitinib have been effective in a subset of dogs with MCTs. I use Palladia at doses of 2.5 mg/kg, PO, MWF, in combination with a gastroprotectant and prednisone (as above).

**Cutaneous lymphomas:**

Most cutaneous lymphomas are of T-cell origin. In humans, there are at least 10 subtypes of cutaneous lymphomas. In the dog mycosis fungoides (MF) constitutes one of the most common forms of presentation. It is usually a chronic, indolent process characterized by erythema, desquamation, pruritus, skin masses or nodules, and occasionally, lymphadenopathy.

Surgery is the treatment of choice for dogs with solitary cutaneous lymphoma. However, this clinical presentation is rare. More often, practitioners are faced with a dog that has diffuse or multifocal lesions; in those patients, systemic chemotherapy is the treatment of choice. Although multiple drugs and drug combinations have been used over the years, most standard chemotherapy protocols such as COP (cyclophosphamide, vincristine, prednisone) or CHOP (cyclophosphamide, doxorubicin, vincristine, prednisone) are of marginal benefit. Recently, we have documented sustained responses to lomustine chemotherapy (60 mg/m², PO, q3wks) with or without prednisone, in a large number of dogs with cutaneous T-cell lymphoma (CTCL). TKIs have been anecdotally effective in dogs with CTCLs.
<table>
<thead>
<tr>
<th>Anatomic Location</th>
<th>Tumors</th>
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<tbody>
<tr>
<td><strong>Head and neck</strong></td>
<td>BCT, SCC, HCT, SA, PCT, CGA</td>
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<td><strong>Extremities</strong></td>
<td>MCT, HPA, FSA, MM (nail bed), SCC (nail bed), NST</td>
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<tr>
<td><strong>Trunk</strong></td>
<td>MCT, LI, SA, FSA, NST</td>
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<tr>
<td><strong>Perineum/genitals</strong></td>
<td>PA, MCT</td>
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Table 1: Preferential anatomic location for common skin tumors in dogs.
Table 2: Preferential layer of origin for common skin tumors in dogs and cats.

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<thead>
<tr>
<th>Dermoeipidermal</th>
<th>Subcutaneous</th>
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<tbody>
<tr>
<td>SCC, BCT, SA, PA, HCT, MCT, CGA, MM</td>
<td>LI, HSA, NST, HPA, FSA, MCT</td>
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<tr>
<td>Epithelial</td>
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<tr>
<td>aCA</td>
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<tr>
<td>Spindle cell tumors</td>
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<td>FSA, HSA, HPA</td>
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<td>Round cell tumors</td>
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<tr>
<td>LSA, MCT, HCT, TVT, BCT, MM</td>
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