Proceeding of the NAVC
North American Veterinary Conference
Jan. 8-12, 2005, Orlando, Florida

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RESPIRATORY NEOPLASIA – WHAT IS TREATABLE?

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NASAL PLANUM TUMORS

Background Information

Tumors of the nasal planum are rare in the dog, but more common in the cat. The most common nasal planum tumor is squamous cell carcinoma (SCC). SCC appears to be an actinic (UV exposure-associated) malignancy in cats and dogs, as evidenced in part by the fact that it appears more commonly in light-coated cats. These tumors can be very invasive locally, but rarely metastasize.

History – PE – Staging

The early stages of nasal planum SCC may simply show mild crusting or scabbing of the nasal planum. Over time (months to years), the lesions can enlarge and become more deeply erosive, erythematous and ulcerated. Lymphadenopathy is rarely appreciated in these cases, and pulmonary metastasis is extremely rare. However, any appreciated lymphadenopathy should be investigated via needle aspiration cytology, and thoracic radiography is reasonable prior to undertaking an expensive or aggressive therapeutic approach.

A diagnosis can be achieved by means of a simple Keyes-type skin punch biopsy, which can be obtained using quick-acting injectable sedation. Imprint or aspiration cytology is typically unrewarding for achieving a diagnosis.

Therapy and Prognosis

The progression of very early lesions may be arrested by limiting sun exposure (i.e. restricting access to the outdoors).

Numerous treatments have been demonstrated to be effective for superficial SCC, including cryotherapy, photodynamic therapy, radiotherapy (RT), hyperthermia, and intralesional chemotherapy (i.e. direct injection into the tumor) with cisplatin or carboplatin. Deeply invasive lesions are typically less responsive to these types of treatment. However, complete excision of the nasal planum (“nosectomy”) can be achieved with acceptable functional and cosmetic results in both cats and dogs. The goal of this therapy is to achieve tumor-free surgical margins, thereby preventing local recurrence. RT has been employed in the post-operative setting for the treatment of residual disease after surgery, and anecdotally has been associated with a good outcome.

TUMORS OF THE NASAL CAVITY AND PARANASAL SINUSES

Background Information

Nasal tumors are uncommon in the dog, and rare in the cat. They are more common in older animals, and there is a possible association between urban environments (potentially due to concentration of airborne pollutants) and the development of nasal tumors in dogs. Nasal tumors may also be more common in dolicocephalic breeds than in brachycephalic breeds.

Roughly 2/3 of the canine nasal tumors diagnosed will be carcinomas arising from the nasal epithelium. Most other tumors are sarcomas (osteosarcoma, chondrosarcoma, fibrosarcoma). In cats, carcinomas are the most common; however nasal lymphoma will be seen as well. Benign nasal tumors are very rare in both species. Nasal tumors are typically very locally aggressive, but will metastasize to regional lymph nodes and lungs late in the course of disease. Most animals will succumb to signs related to the local extent of the tumors, and not to metastasis. Although up to 40% of patients may have evidence of metastasis at the time of death, they are rarely symptomatic.

History – PE – Staging

The most common clinical sign of a nasal tumor is unilateral epistaxis, often associated with sneezing or increased respiratory stridor. It is common for epistaxis to become bilateral as the disease progresses. Occasionally, animals may present for nasal discharge of another character (i.e. serous, mucoid), facial swelling or deformity, or exophthalmia. More rarely, animals may present with signs related to central nervous system dysfunction (seizures, altered mentation, ataxia, etc), as a result of direct tumor invasion into the brain.

It is common for animals with nasal tumors to present with a long history of clinical signs (average 3 months). Often these animals will have been treated symptomatically with multiple courses of various antibiotics or anti-inflammatories. It is also common to see temporary improvement in clinical signs as a result of antibiotic therapy, which may lead to the spurious conclusion that infection, is the primary cause of the animal’s clinical signs. The environment in a tumor-bearing nose serves as fertile ground for bacterial colonization, and these tumors are almost always secondarily infected.

** An older animal with a history of unilateral epistaxis should be considered to have a nasal tumor until proven otherwise.

Physical examination may reveal decreased air flow through one or both nostrils, and a serous or hemorrhagic crust may be present at the nostril. There may be evidence of palatal or nasal deformation, and the patient may resent palpation of the nose or opening of the mouth. The eyes should be evaluated carefully for symmetry, and the patient may resent palpation of the nasal masses. The eyes should be evaluated carefully for symmetry, and the patient may resent palpation of the nasal masses. The eyes should be evaluated carefully for symmetry, and the patient may resent palpation of the nasal masses.

Needle aspiration cytology of regional lymph nodes and thoracic radiographs should be obtained prior to more invasive diagnostic tests, but are rarely positive at presentation. Prior to invasive diagnostics, appropriate testing (which might include platelet count, activated clotting time, mucosal bleeding time, prothrombin time, and/or partial thromboplastin time) should be performed to rule out a systemic bleeding disorder as the cause for epistaxis, and to insure that biopsy procedures will not lead to uncontrollable bleeding.

A good series of anesthetized skull radiographs are essential for determining the severity and extent of the nasal disease, and will help to guide the collection of tissue for histopathology. Accurate positioning is imperative, and the most useful radiographic view is often the open-mouthed dorsoventral view. A combination of turbinate lysis and increased soft-tissue opacity is commonly observed in cases of aggressive nasal cavity disease. Computed tomography, if available, can give more information than skull radiographs, and is necessary for the planning of treatments such as RT.
Rhinoscopy with either a rigid needle scope (also used for arthroscopy) or a flexible scope can be utilized to directly visualize the nasal cavity. If using a flexible scope, the cavity should be evaluated from the transnostril approach, and the scope should also be retroflexed behind the soft palate to examine the caudal nasopharynx. It is difficult to obtain sufficient quantities of tissue for histopathology through the biopsy ports present in most scopes that can fit up the nose.

Cytologic assessment of nasal swabs or expectorated material is of very limited use in the diagnosis of nasal tumors. A sample of tissue is usually required for accurate diagnosis. Under the same anesthesia as imaging, tissue can be procured from the area of interest. There are three basic techniques that can be used to obtain tissue:

1) Nasal Flush: In this procedure, a rubber bulb syringe filled with warm water or isotonic saline is inserted into the nostril, a tight seal is formed with the hand, and the fluid is VIGOROUSLY flushed into the nasal cavity (it is important that an endotracheal tube with a well-sealed cuff is in place for this procedure). The head is placed over a basin, into which the flushed material is collected. It is common for large pieces of friable material suitable for histologic evaluation to be flushed out of the nasal cavity using this technique. This is probably the least traumatic method.

2) Pinch Biopsy: Using the results of imaging studies to identify an area of interest, a rigid (uterine biopsy forceps, for example) or flexible (i.e. transendoscopic) biopsy instrument can be advanced into the nostril and used to pull out pieces of material.

3) Transnostril Core Technique: Either a large-bore channel biopsy needle (i.e. Tru-cut) or a plastic canula (3-5 mm in diameter) is passed into the nostril and guided to the area of interest identified by imaging. Negative pressure is applied to the canula with a syringe as it is forcefully advanced into the nasal tissue. Very large cores of tissue are commonly obtained with this technique.

It is important with methods 2 and 3 that the biopsy instruments not be advanced further than the distance from the tip of the nares to the medial canthus of the eye, or there is a risk of penetration of the cribiform plate! Biopsy instruments should be marked with tape or cut off at the appropriate distance to prevent this from happening.

Therapy and Prognosis

Surgery alone does not increase survival in most patients with nasal tumors, when compared to doing nothing.

The treatment of choice for nasal tumors in dogs and cats is radiotherapy. Numerous dosage and fractionation schemes have been reported, and the outcome is similar for most, with most dogs experiencing significant resolution of their clinical signs, and median survival times typically in the 12 month range. Prognosis is associated to some degree with tumor histotype, and whether or not there is evidence of penetration of the bones surrounding the nasal cavity (orbit, hard palate, nasal bones, cribiform plate). As stated above, most dogs will be euthanized due to recurrence of clinical signs rather than due to metastatic disease. The most important side effect of radiotherapy to the nasal cavity is temporary or permanent changes to the eye, such as keratoconjunctivitis sicca, cataracts, retinal degeneration, and chronic keratitis.

The location and extent of the tumor as assessed by CT often determines whether these changes will take place and how severe they are likely to be.

A notable exception to the survival statistics quoted above can be found in cats with nasal lymphoma. Assuming that complete clinical staging reveals no evidence of disease outside the nasal cavity, rapid and complete remission of clinical signs can be expected, and survival times can be very long, with "permanent" control achieved in some animals.

Chemotherapy (most commonly with carboplatin or cisplatin) has been shown to palliate clinical signs in some patients, however appears to offer no significant extension of life. Combinations of radiotherapy and chemotherapy, and radiotherapy and surgery are being explored, and may prove to be superior to radiotherapy alone. We have recently trialed combination chemotherapy of doxorubicin and carboplatin with Piroxicam with encouraging preliminary results.

For owners for whom radiotherapy is not feasible, many dogs can experience improvement in their clinical signs with periodic courses of antibiotics. The progression of disease can be quite slow, and survival is often dictated by how much sneezing and epistaxis the owners can tolerate. Other methods of palliation could include periodic “therapeutic” nasal flushes (as described above), or treatment with piroxicam, a potent oral nonsteroidal anti-inflammatory drug with excellent analgesic and anti-inflammatory properties, and demonstrated antitumor activity against certain carcinomas (although not historically nasal carcinoma).

LUNG TUMORS

Background Information

Primary lung tumors are relatively rare in dogs and cats, especially when compared with the astronomical tobacco-associated incidence of such tumors in humans. Metastatic lung cancer is much more common than primary lung cancer in both the dog and the cat. The vast majority of lung cancers in domestic animals are malignant, with carcinomas arising from the respiratory epithelium being most common. Again, some studies have suggested that dogs living in an urban environment may be at increased risk when compared with dogs living in a rural environment.

History – PE – Staging

The most common presenting complaints in animals with lung tumors are (in decreasing frequency) cough, dyspnea, lethargy, and weight loss. Approximately 25% of cases will be discovered incidentally, without any evidence of clinical signs. In cats, a percentage of animals will present with signs referable to a mass at an external site (e.g. digits, face, etc.). Thoracic radiographs then reveal a pulmonary mass later confirmed to be primary pulmonary neoplasia.

Physical examination may reveal increased respiratory rate and effort, or dullness on auscultation. Thoracic radiographs provide the most important information in obtaining a diagnosis of lung cancer. They will usually demonstrate a solitary, spherical mass, often in the caudal lung lobes. Occasionally, pleural effusion or evidence of tracheobronchial lymphadenopathy may be observed. Advanced imaging (e.g. CT scan) can better delineate the extent of the mass, and may yield evidence of intrapulmonary metastasis or lymphadenopathy that is not detectable by conventional radiographs. Needle aspiration cytology (often performed under ultrasound guidance) may confirm a diagnosis of...
Small Animal - Oncology

671

carcinoma. Often, a histologic diagnosis is only reached at the time of definitive therapy.

Treatment and Prognosis

For patients with a solitary lung mass without evidence of metastasis, thoracotomy with complete lung lobectomy is the treatment of choice. The tracheobronchial lymph nodes and all lung lobes should be carefully evaluated at the time of surgery, and biopsy should be performed of any enlarged lymph nodes.

The median survival time after surgery for dogs with primary lung tumors is approximately one year. The major prognostic factors for survival are: 1) Presence or absence of lymph node metastasis; 2) Presence or absence of clinical signs at presentation; 3) Histologic grade of the tumor.

Although adjuvant treatments such as chemotherapy and RT are effective in the management of human lung cancer, the role of these modalities in the treatment of lung tumors in domestic animals has been poorly evaluated. In patients with high-risk disease (e.g. high histologic grade or lymph node metastasis), the addition of chemotherapy may be reasonable. We are currently evaluating adjuvant chemotherapy on the outcome in dogs with lymph node-positive lung cancer, in which the prognosis is extremely poor (median survival time = 60 days with surgery alone).

MANAGEMENT OF LATERAL THORACIC WALL MASSES IN DOGS

Masses involving the lateral chest wall of dogs are seen infrequently in general veterinary practice. Such lesions are, however, usually primary malignant tumors of ribs. They pose a serious clinical problem because full thickness chest wall resection is necessary for successful management. The work-up, surgical procedure, after-care, adjunctive therapy, follow-up, and potential complications will be presented.

There have been 295 dogs reported in the literature with chest wall tumors and of these 201 have documented long term follow-up. Chondrosarcoma, osteosarcoma, hemangiosarcoma and fibrosarcoma are the common tumors affecting the ribs with the first two mentioned histologies being the most common. Dogs with chondrosarcoma of the ribs have the best prognosis following resection with reported median survival times up to 250 weeks. Dogs with malignant rib tumors treated conservatively without surgery have a poor prognosis with reported median survival times of 2 to 15 weeks depending on the histology. Wide surgical margins including at least one unaffected rib cranial and caudal to the lesion and dorsal and ventral margins allowing 2-3 cm of grossly unaffected rib are necessary for successful en block resection of malignant primary rib tumors. Reconstruction involves the use of polypropylene mesh, diaphragmatic advancement, latissimus dorsi muscle flaps, or a combination of these with or without augmentation using omental pedicle grafts. Analgesia can be effectively provided pre-emptively, intra-operatively and postoperatively by intercostal nerve blocks, opiates either delivered by systemic administration (constant rate infusion or intermittent intravenous or subcutaneous injections) or by transdermal patches, epidural morphine, intrapleural local anaesthesia, and non-steroidal anti-inflammatory drugs as well as newer and alternative analgesic strategies. Adjuvant chemotherapy drugs are usually recommended for dogs with osteosarcoma. Carboplatin, cisplatin and doxorubicin either as single agents or in some combination have demonstrated efficacy in treating dogs with osteosarcoma. The efficacy of chemotherapy drugs in the adjuvant setting for treating dogs with chondrosarcoma has not been demonstrated. In the author’s experience, dogs with hemangiosarcoma of the ribs have very poor prognoses, as metastatic disease, either measurable or occult, is almost invariable. However, two dogs in one study lived 48 and 52 weeks after surgery and survival times as long as 112 weeks have been reported. Dogs with rib fibrosarcoma have been reported to have a median survival of 26 weeks with a range of 16-64 weeks. Metastatic disease has been reported in dogs with chest wall tumors especially those with hemangiosarcoma and osteosarcoma. Recurrence is not common after wide resection with reported incidences of 10-15%. Histologically determined complete surgical margins confer an improved probability for local control.

Early wide surgical excision is recommended in the management of tumors of the canine lateral thoracic wall. This treatment has been reported to be associated with low long-term morbidity and excellent survival probabilities for dogs with certain histological types of primary rib cancer.