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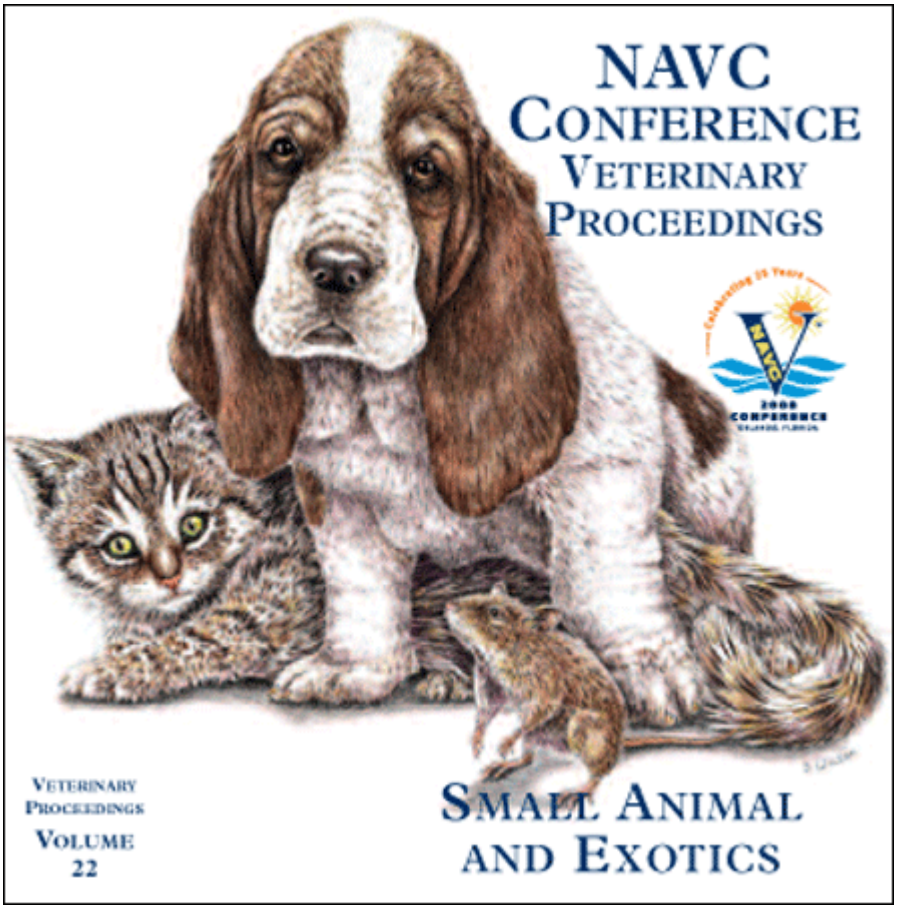

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WHAT TO DO ABOUT NASAL TUMORS

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Intranasal tumors are reported to account for 1% to 2% of all tumors in dogs making them relatively uncommon tumors. These tumors can arise from within the nasal cavity itself or from within the paranasal sinuses. In addition, tumors can arise from the oral cavity, the nasal planum or the ocular orbit and can subsequently extend into the nasal cavity. Tumors arising from locations other than the nasal cavity or sinuses, except for nasal planum squamous cell carcinomas in the dog are not covered in this session. The vast majority of nasal tumors are malignant with reports indicating that only 10% to 20% of all nasal cavity tumors are benign in nature. Generally, nasal tumors are locally invasive and often only metastasize late in the course of the disease. At the time of diagnosis, the metastatic rate is reported as being less than 10%. In one necropsy study however, the metastatic rate increased to nearly 50%, with the most common sites of metastasis being the regional lymph nodes and lungs.

Some reports have found a higher incidence of nasal tumors in males, with the male to female ratio being from 1.3:1 to 3:1 depending on the study; while still other studies found no sex predilection. One theory for this is that urine marking and sniffing in the dog's territory could cause an increased exposure to environmental carcinogens.

Mixed breed dogs appear to have a similar incidence of intranasal tumors as purebred animals. There are certain breed predilections, however. Dolichocephalic breeds including collies and shelties have an increased incidence of nasal tumors, while brachycephalic breeds are often under represented in studies. One theory that accounts for these differences is based on anatomy. Brachycephalic breeds have a decreased surface area in their nasal passages and often mouth breath leading to decreased exposure of the nasal cavity to environmental carcinogens. On the other hand dolichocephalic breeds have an increased surface area in the nasal passages and nasal turbinates (that act as a filter) leading to increased carcinogen exposure.

Studies looking at environmental exposure to carcinogens as a cause for nasal tumors have been conflicting in nature. One study found an increased risk of nasal tumors in dogs that had a history of exposure to tobacco smoke while another did not. Another study found exposure to kerosene and coal heaters to be a risk factor. Still another found no increased incidence of nasal tumors for those dogs living in cities or within one mile of a factory. All of these studies suffer from having small numbers of patients enrolled (low power); meaning much larger numbers of dogs would be needed to expect to find differences between the groups.

CLINICAL SIGNS

Clinical signs are often nonspecific, resulting from destruction of normal structures. Clinical signs are present on average for 3 months with the range from 1 to 36 months before a diagnosis is made. Subsequently, nasal tumors are often advanced by the time that they are diagnosed.

Clinical signs of nasal tumors include epistaxis, nasal discharge (bloody, mucoid or mucopurulent), sneezing, respiratory stridor, neurologic signs and facial deformity. These signs can be unilateral or bilateral depending on the extent of the tumor.

The location of tumor within the nasal cavity affects the signs seen. For example if the tumor extends through the cribriform plate into the brain, the presenting signs can include seizures, neurologic deficits or behavioral changes. If the tumor extends through the orbit, ocular changes may be seen including exophthalmos, enophthalmos and ocular discharge.

DIFFERENTIAL DIAGNOSIS

As mentioned above the clinical signs of nasal tumors are often nonspecific. Facial deformity can be caused by a tooth root abscess. Nasal discharge can be caused by fungal infections with aspergillosis, allergic disease, foreign bodies such as foxtails, or parasites such as nasal mites. Epistaxis can be caused by foreign bodies, thrombocytopenia, hypertension, fungal infections, or bleeding disorders. What is important to note, however, is that primary bacterial rhinitis is rare in the dog and is should generally not be considered on your primary list of differentials for nasal discharge.

DIAGNOSIS AND STAGING

The initial workup for a patient suspected of having a nasal tumor includes a physical exam assessing for ocular and nasal discharge. The nasal passages should be assessed individually for airflow, the eyes retropulsed, local lymph nodes should be assessed for size and firmness, and the patient should be thoroughly ausculted.

A complete blood count (CBC), chemistry panel, and urinalysis should be obtained to evaluate the overall health of the patient and to help rule out other differentials as to the cause of the clinical signs. If neurological signs alone are present, a cerebrospinal fluid (CSF) tap may be indicated. If excessive bleeding is present, a clotting panel (including a prothrombin time [PT] and partial thromboplastin time [PTT]) should be obtained before performing a biopsy.

Thoracic radiographs should be taken to help rule out pulmonary metastasis, although studies indicate pulmonary metastasis occurs in only 3% to 10% of patients with nasal tumors at the time of diagnosis. Local lymph nodes should be examined and aspirated, particularly those that are firm, fixed in place or enlarged.

The nasal cavity and sinuses also need to be imaged. Nasal radiographs can be used, although they are less sensitive and specific than a CT scan. Changes seen on nasal radiographs include increased opacity in the nasal cavity or sinuses, turbinate destruction,

deformation or loss of the nasal septum and cribriform plate destruction. The increased opacity seen on nasal radiographs can be difficult to interpret as mucous or blood in the nasal cavity or sinuses will look the same as a soft tissue mass. Bone destruction will also have to be extensive in order for it to be seen on plain radiographs.

CT scans provide a much more sensitive means for evaluation of the nasal cavity. Small areas of bony destruction including those in the cribriform are easily identified on CT if thin slices are obtained. The hard palate can also be evaluated which is important as its destruction and subsequent treatment can lead to oral nasal fistulas. Also, the submandibular and retropharyngeal lymph nodes can be evaluated on a CT scan, looking for asymmetry, enlargement and contrast enhancement filling defects.

A biopsy of the tumor is required for definitive diagnosis. There are multiple techniques for obtaining a biopsy. The best and easiest technique often depends upon the location of the tumor. Nasal tumor biopsies can be difficult often resulting in nondiagnostic samples. Small sized biopsy samples may only sample peritumoral inflammation, but larger samples carry a higher risk of complication (excessive hemorrhage). If the tumor is rostral it can sometimes be visualized using an otoscope cone and light source and can then be biopsied using alligator or pituitary cup forceps. Biopsies can be taken blindly but care should be taken not to place any instruments in further than the medial canthus of the eye so as not to penetrate the cribriform plate. A large bore plastic cannula placed on the end of a syringe can also be used for taking a blind biopsy. Rhinoscopy can be used to visualize and biopsy a nasal cavity tumor with the advantage of being able to visualize the area to be biopsied increasing the chance of obtaining a diagnostic sample. If there is facial deformity a punch biopsy sample can be taken. This can be helpful in those tumors arising from the frontal sinuses that break through the bone. Nasal flushes can sometimes yield pieces of tissue that can then be turned in for histopathology. Nasal flushes for cytology can sometimes be helpful in obtaining a diagnosis in cases of lymphoma, but with other tumor types this technique usually does not yield a diagnostic sample.

After a biopsy is taken the nasal cavity can be packed to help control bleeding. Several drops of phenylepherine (nasal spray) can be placed in the nasal cavity to help control bleeding. In severe cases of hemorrhage, epinepherine can be placed in the nasal cavity. Some bleeding over the next 1 to 2 days can be expected post biopsy.

Histopathology

The most common histologic types of nasal tumors are carcinomas (adenocarcinoma, carcinoma, transitional cell carcinoma, squamous cell carcinoma, and undifferentiated carcinoma), sarcomas (chondrosarcoma, osteosarcoma, undifferentiated sarcoma, and fibrosarcoma) and uncommonly mast cell tumors, transmissible venereal tumors (TVT), or lymphoma.

Prognostic Factors

Reported prognostic factors for intranasal tumors in the dog include facial deformity, destruction of the cribriform plate, lymph node involvement and the tumor crossing midline on imaging studies. Sarcomas in dogs are also thought to have a better prognosis with treatment than carcinomas.

Treatment Options

The median survival time for dogs with intranasal tumors without treatment is reported at 3 to 6 months. Palliative care includes antibiotics to treat secondary bacterial infections. If excessive epistaxis is present then ligation of one or both carotid arteries can sometimes provide relief without compromise to the patient.

Chemotherapy has only been used in a small number of cases of nasal carcinomas and sarcomas and is difficult to evaluate. There are reports of dogs receiving cisplatin with a 27% overall response rate and a median survival of 20 weeks. In one small study with 8 dogs, the use of alternating carboplatin, doxorubicin, and piroxicam at standard doses resulted in a response in the majority of dogs. Chemotherapy with vincristine can be curative for transmissible venereal tumors, requiring only several doses for a complete response in most cases. Reports of treatment of nasal tumors with immunotherapy and cryotherapy have not shown an advantage over no therapy alone.

Surgery alone has not been shown to increase survival times for malignant tumors. Rhinotomy procedures are invasive and have a substantial degree of morbidity and mortality associated with them. For these reasons surgery alone is not considered to be an effective treatment for intranasal or sinus neoplasia. Surgery can be used, however, to debulk a tumor before treatment with orthovoltage radiation.

Orthovoltage radiation therapy is a form of low energy radiation. Due to the poor penetration of this type of radiation, rhinotomy is required before attempting treatment. Because there is no skin sparing effect these patients tend to have high rates of morbidity associated with this treatment. As much of this type of radiation is absorbed in the bone late effects seen can include bone necrosis and subsequent fistula formation. Median survival times reported for orthovoltage radiation therapy are thought to be similar to those for megavoltage radiation therapy (see below).

Megavoltage irradiation of nasal tumors is the most commonly used method of treatment. Megavoltage radiation therapy is delivered by either linear accelerators or cobalt units with an energy of greater than 1 million electron volts. These machines also have the advantage of delivering the maximum amount of radiation below the surface of the skin (skin sparing effect). They also allow for better dosimetry and computer planning, allowing for less normal tissue to be irradiated and less side effects.

Median and mean survival with radiation therapy range from 8 to 25 months in different reports. We generally quote 8- to 12-month median survivals for dogs with carcinomas and 12- to 18-month median

survival in dogs with sarcomas. In the literature the 1-year survival rates range from 20% to 81% and the 2-year survival rates range from 10% to 48%. Dogs with nasal planum squamous cell carcinoma have median survival of 2 to 3 months with treatment. Due to the poor prognosis treatment is generally not recommended with current dosing protocols.

Side effects from radiation therapy can be broken down into acute and late effects. Since radiation therapy is a localized therapy only the tissues in the radiation field are affected and depend upon the particular set-up for each patient. If one or both eyes are included in the field the patient should be monitored acutely for a corneal ulcer and long term for the development of keratoconjunctivitis sicca (KCS) and cataract formation. Rhinitis and mucositis in the oral cavity are also common side effects of radiation therapy. Usually these signs begin in the third week of therapy and resolve within several weeks of completion of therapy. Hair loss is common in the radiation field. Generally the hair will grow back, but new hair growth will be gray or white. The hair may also grow in thinner than normal.

It must also be remembered that the initial clinical signs seen by the owners may not resolve, depending on the amount of normal tissue destruction and nasal discharge and sneezing may continue.

References are available from the author upon request.