

Addy's Nasal Nonsense

by:

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Introduction:

Nasosinal tumors account for approximately 1-2% of canine neoplasms. Nasal tumors most commonly occur in older dogs, with a mean age of 9-10 years old.¹ Research suggests that dolichocephalic (long-nosed) breeds may be at higher risk for development of nasal tumors and medium to large breeds appear to be more commonly affected.² Two-thirds of canine nasal tumors arise from epithelial origin with the most common being adenocarcinoma followed by less frequent occurrences of squamous cell carcinoma and anaplastic carcinoma. Of the nasal tumors arising from mesenchymal origin, most are chondrosarcomas followed by fibrosarcomas, and less frequently osteosarcomas.¹ This discussion will focused on a case of nasal osteosarcoma.

History and Presentation:

Addy, an approximately 9-year-old female spayed mixed breed dog, presented to Mississippi State University College of Veterinary Medicine's Internal Medicine department on June 17, 2021, for a greater than one year history of intermittent reverse sneezing and one incidence of unilateral (left-sided) epistaxis. On June 6, 2021, Addy was noted to be having an episode of reverse sneezing that was more severe than normal and she developed difficulty breathing. At that time, Addy was taken to her primary care veterinarian where she was started on doxycycline and referred to MSU-CVM Internal Medicine for further assessment.

On presentation, Addy appeared bright, alert, and responsive, weighing 18.1 kg with a body condition score of 5/9. Her mucous membranes were pink and her CRT was less than 2 seconds. Addy had a temperature of 99.6°F, heart rate of 100 beats per minute, and respiratory rate of 36 breaths per minute. Her abdomen palpated normally and no lymph node enlargement was able to

be appreciated. Addy's heart and lungs auscultated normally with no crackles, wheezes, or murmurs heard. Oral exam revealed mild dental tartar but no other abnormalities. A small (1-2 cm) raised, firm lesion was present on the dorsal aspect of her muzzle; this defect did not appear erythematous or irritated, and palpation did not elicit a painful response. The remainder of her physical exam was within normal limits.

Diagnostic Approach:

A CBC, chemistry, and coagulation profile were performed and did not reveal any significant abnormalities. Routine thoracic radiographs were taken, and they did not show any signs of pulmonary metastatic neoplasia. CT of the skull revealed a fluid and soft tissue attenuating material within the entirety of the left nasal passageway that extended caudally into the choanae to form an ovoid structure. There was loss of the nasal turbinates within the left nasal passageway, nasal septum, and extension of the soft tissue and fluid attenuating material within the caudal aspect of the right nasal passageway, right frontal sinus, and left frontal sinus. Mild periosteal proliferation was present along the medial aspect of the left maxillary bone just caudal to the canine tooth and there was permeative lysis of the left maxillary bone, left lacrimal bone, and left frontal bone. These findings were consistent with neoplastic, or less like, fungal infiltration.

Rhinoscopy was performed using a pediatric gastroscope in retroflexion to evaluate the caudal nasopharynx. There was a pink mass extending caudally from the left nasal passage noted and 5 pinch biopsies were obtained from this mass. The oropharynx was then packed with a laparotomy sponge and the rigid rhinoscope with saline irrigation was used to evaluate the left nasal cavity. There was a large pink vascular mass taking up nearly the entire left nasal cavity which was quick to bleed when disrupted. The right nasal mucosa was also erythemic and

irregularly marginated. Nasal biopsies were obtained antegrade bilaterally and a mild amount of hemorrhage was noted. Ice was applied to the patient's nose and then she was recovered from anesthesia.

Histopathology confirmed that the nasal mass was osteosarcoma with chondroblastic differentiation. It appeared as a moderately cellular neoplasm composed of spindle to polygonal cells arranged in streams or widely spaced and isolated in lacunae by a pale basophilic chondroid matrix, and in multifocal foci by a bright eosinophilic matrix (osteoid) which was found to be expanding and replacing nasal mucosa and submucosa in multiple fragments of nasal tissue. The neoplastic cells had small amounts of pale eosinophilic cytoplasm, ovoid nuclei with finely stippled chromatin and 1-2 indistinct nucleoli. There were 6 mitotic figures present in 7 high powered fields (2.37mm²). Adjacent fragments of nasal tissue had a submucosa infiltrated by numerous mixed inflammatory cells including neutrophils, macrophages, lymphocytes, and plasma cells.

Pathophysiology:

Approximately one-third of all dogs with chronic nasal disease have nasal neoplasia with approximately 80-90% of those being malignant neoplasia.³ Osteosarcoma is a malignant neoplasm of mesenchymal origin that accounts for the majority of primary bone tumors in dogs.⁴ This bone matrix-producing neoplasm arises from transformed mesenchymal cells that differentiate into osteoblasts. Osteosarcomas most often arise from the long bones of the appendicular skeleton; however, they can arise from bones within the axial skeleton.⁵ Osteosarcoma of the axial skeleton accounts for 25% of all osteosarcomas.^{2,3} The most common sites of axial osteosarcoma are mandible (27% of axial osteosarcomas), maxilla (16-22%), vertebrae (7-15%), scapula (13%), skull (11-12%), ribs (10-11%), nasal and paranasal sinuses

(9%), and pelvis (4-5%)³. The metastatic rate of axial osteosarcoma in dogs is 11-46%, with the lungs being the most common site for metastasis.^{2,3} Although metastasis can and does occur, most dogs with axial osteosarcoma die or are euthanized due to direct effects of the tumor and its impact on surrounding structures. The median survival time for dogs with axial osteosarcoma is 120-154 days with 26% having a 12 month survival rate and 18% having a 24 month survival rate.⁶ Dogs with nasal tumors typically present with clinical signs that are attributed to upper airway obstruction such as respiratory distress, epistaxis, and sneezing. Other reported clinical signs include reverse sneezing, stertorous breathing, serous or mucoid nasal discharge, facial deformity or swelling, and central nervous signs such as seizuring or behavioral changes.³

Treatment and Management:

For most cases of axial osteosarcoma surgical resection is the recommended treatment with CT being used for staging and surgical planning.³ Radiation constitutes the mainstay of therapy in cases where tumor resection is not feasible or is unsuccessful. Adjuvant chemotherapy has been documented in cases where tumor resection was incomplete; however, there is little evidence to suggest that it results in more favorable outcomes.⁷ Additional treatment options based on immunotherapies exist but are currently still being researched, and at this time have not shown significant positive impacts on survival.⁴ Sinonasal tumors in dogs can rarely be cured without treatment, and euthanasia is generally elected within a few months after diagnosis due to the progression of local disease.³ Early diagnosis of intranasal osteosarcoma is associated with improved patient outcome regardless of the treatment option chosen.⁸

Case Outcome:

In Addy's case surgical removal of the tumor was not a viable option due to the location. Due to financial constraints and prognosis, Addy's owners opted to forgo treatment and instead chose to have her live her life normally until her quality of life becomes impaired. They were instructed to monitor Addy for signs of further tumor growth, which may include pain opening her mouth, nasal or ocular bleeding, and neurologic signs. It was also advised that they consult with their primary veterinarian about pain control medications to keep Addy comfortable at home.

Discussion:

Aggressive neoplasia should always be considered when dealing with cases of chronic nasal disease, especially in older animals. Appropriate diagnostic measures should always be taken to rule out the possibility of inflammatory or infectious etiology which could be treatable. Even when detected early, the prognosis of dogs with nasal osteosarcoma is generally poor and treatment is often unrewarding.

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