Proceedings of the
47th British Equine Veterinary Association Congress
BEVA

Sep. 10 – 13, 2008
Liverpool, United Kingdom
10.00–10.15
**Neoplasia of the paranasal sinuses**

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**INTRODUCTION**

Tumours of the paranasal sinuses are rare in equids. In a study of 277 referred cases of equine sino-nasal disease over a 12 year period 22 (7.9%) had sino-nasal neoplasia (Tremaine and Dixon 2001). The mean age at presentation was 11 years and the duration of signs averaged 3 months. The incidence of paranasal sinus neoplasia in animals with chronic sinus disease in our clinic is lower than those reported above. Horses with malignant paranasal sinus neoplasia have a hopeless prognosis but treatment of some of the more benign neoplasms can be successful.

**CLINICAL SIGNS AND PHYSICAL EXAMINATION**

The clinical signs associated with paranasal sinus neoplasia are usually nonspecific, indicating chronic sinus disease. Such signs include nasal discharge and epiphora. If the mass has grown to a sufficient size there may be facial distortion and even exopthalmos. There may be some softening and thinning of the overlying bone. There may be obstruction to nasal airflow as a result of deviation of the turbinates or nasal septum resulting in narrowing of the nasal passages. This may result in abnormal respiratory noise and even exercise intolerance. It can be useful to occlude one nostril in order to assess the patency of the other.

The nasal discharge can be variable in character and may be malodorous. The discharge is usually as a result of the mass affecting mucociliary clearance and causing obstruction to sinus drainage leading to secondary infection. Antibiotic therapy may alleviate the discharge but not the primary condition. Submandibular lymphadenopathy is another nonspecific finding and is more likely to be the result of secondary sinus infection rather than metastasis. As the sinuses are large air-filled cavities it is not unusual for space occupying lesions to be well advanced before any overt clinical signs develop. This author does not find sinus percussion to be of diagnostic value. A thorough oral inspection should always be part of any chronic sinus condition investigation. Findings can include cheek tooth displacement, oro-maxillary fistulae and visible neoplasia of the hard palate (in particular squamous cell carcinoma).

**DIAGNOSTIC PROCEDURES**

Radiography is useful for indicating sinus disease but is not often specific for neoplasia. The patient should be well sedated with the nose down; this helps to reveal air-fluid interfaces. The most useful view is the 30° oblique (from lateral) projection. Dorso-ventral projections can provide information on the nasal septum and can help to demonstrate if there are any changes within the ventral conchal sinuses. Radiographic abnormalities include sinus fluid lines and soft tissue and dense tissue masses. Bone destruction, proliferation and soft tissue mineralisation can all be suggestive of a neoplastic process. The radiographic changes with neoplasia may resemble a tooth root abscess and neoplasia should be suspected if there is involvement of more than one tooth. Expansion and distortion of sinuses, cheek tooth and septal deviation can all indicate an enlarging sinus mass.

Endoscopy of the upper respiratory tract should be a routine part of the investigation. This can provide information on septal and turbinate deviation, and can demonstrate discharge from the region of the naso-maxillary opening and on occasion show masses protruding into the nasal cavities. Endoscopy of the contralateral nasal meatus may show septal deviation or possibly a protruding mass beyond the nasal septum.

Sinoscopy through an appropriately placed trephine hole(s) provides direct visualisation of the interior of the sinuses. If the affected sinuses contain much free fluid irrigation may be required for 1–2 days with aspiration before inspection. Biopsies or aspirates can be taken from any detected lesions under endoscopic guidance. Sinoscopy (with biopsy results) will provide useful information on whether surgery is a viable option and the best anatomical approach. If biopsies indicate neoplasia then a needle aspirate of any enlarged regional lymph nodes would be prudent.

**DIFFERENTIAL DIAGNOSES**

Differentials include chronic sinusitis (primary and dental in origin), trauma, sinus cysts and ethmoid haematoma.

The cause of nasofrontal suture line periostitis is not known but thought to be trauma. Such cases present with rapid onset facial swelling. These swellings can be painful (unlike neoplasia) and compromise nasolacrimal drainage. Radiographs usually show some new bone formation in the region of the suture line but no sinus involvement.
In the author’s experience sinus cysts are the most common expanding sinus mass. Ethmoid haematomata is somewhat less common and neoplasia is rare.

Horses are occasionally presented with chronic inflammatory granulomatous masses within the sinuses. These can reach considerable size and consist of dense white/yellow tissue; they are most likely to result from chronic sinus infection. Histological differentiation of such lesions is difficult and it can be hard to distinguish from benign sinus neoplasms.

**TYPES OF NEOPLASM**

Normal sinus epithelium is pseudostratified, ciliated columnar epithelium with mucous producing cells. The underlying lamina propria consists of loose connective tissue continuous with the periosteum of the underlying bone. Numerous mucous producing glands are present within the lamina propria with ducts connecting them to the epithelial surface. The lamina propria is well vascularised with lymphoid aggregates. Neoplasia within the sinuses can develop from any of these tissues.

Squamous cell carcinoma is the most commonly reported malignancy in the paranasal sinuses. It is usually encountered in older horses and most often affects the maxillary sinuses. There is debate as to whether such tumors actually originate from within the sinuses or invade from adjacent structures including the oral cavity. Squamous cell carcinoma is the most frequently encountered oral-pharyngeal malignancy in the horse. For squamous cell carcinoma to be primarily sinus in origin the mucosal lining of the sinuses would need to undergo squamous metaplasia so the condition would seem more likely to arise from the oropharynx (Howie et al. 1992). Adenocarcinoma usually affects older horses and appears to involve the frontal more than the maxillary sinuses. This is the second most common recorded malignancy. These tumours can invade through the cribiform plate leading to CNS involvement. Haemangiomata and angiosarcoma of paranasal region are extremely rare. Lymphosarcoma of the paranasal sinuses may originate from within the sinuses or from the nasal passages. It can affect both young and older horses and is an aggressive tumour. It will often metastasise. Fibrosarcoma has been diagnosed occasionally, mainly in younger animals (Hance and Bertone 1993). There is a report of an extremely rare odontogenic sinus tumour (ameloblastoma) and also a sinus melanoma (Dixon and Head 1999).

Osteoma of the paranasal sinuses usually affects younger horses. Radiography reveals a dense bony mass within the sinuses. These can expand rapidly leading to facial deformity and displacement of the teeth. Unlike most tumours of the paranasal sinuses surgery for their removal can be successful (Hance and Bertone 1993). Other reported benign neoplasms include adenoma, fibroma/myxoma, fibrous osseous tumours. Even with histology the fibroma/myxoma type can be hard to distinguish from chronic inflammatory, granulomatous masses.

In the report by Dixon and Head (1999) 28 cases of equine nasal and paranasal sinus neoplasia occurred over a 20 year period. Many of these cases underwent some form of excision surgery and a few lived for a period of time before regrowth. The 4 animals that survived long term had all been treated for benign neoplasms (adenoma, fibroma, osteoma and melanoma).

**TREATMENT**

In the large majority of cases with paranasal sinus malignancies euthanasia is the only realistic option. If the diagnosis indicates a benign neoplasm then any treatment may involve surgical removal by an approach through either a maxillary or frontal bone flap depending on location and size of lesion. The frontal approach provides a larger portal and better overall access to the sinuses. The surgery is best performed under standing sedation. The sinuses may need to be packed following surgery to control haemorrhage. Once the packing has been removed the sinuses are irrigated daily.

**REFERENCES**


