LE DIAGNOSTIC CLINIQUE DES AFFECTIONS NASALES ET SINUSALES

CLINICAL DIAGNOSIS OF DISORDERS OF THE EQUINE NASAL CAVITIES AND SINUSES

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Résumé : La cavité nasale et les sinus naseaux associés du cheval peuvent présenter différentes affections, entraînant principalement des perturbations de la circulation de l’air ou un jetage unilatéral. La paralysis nasale, la vibration du diverticule nasal (“false nostril flutter”) et le collapsus du pli alaire peuvent tous augmenter considérablement les bruits respiratoires à l’entraînement, et ces bruits doivent être différenciés les uns des autres, mais aussi des bruits provoqués par des obstructions nasopharyngiennes et laryngiennes importantes. L’épistaxis est rarement d’origine nasale, et s’il survient, la plupart des cas traumatiques ou d’origine sinusienne se résolvent spontanément. Un hématome ethmoïdal progressif sera suspecté en cas d’épistaxis chronique, de faible importance et unilatéral. La confirmation est endoscopique. La plupart des jetages unilatéraux purulents du cheval sont causés par une sinusite, principalement primaire ou d’origine dentaire. Ils peuvent aussi être déclenchés par des kystes, des néoplasies ou des mycoses sinusales. Plus rarement, une mycose nasale ou l’infection apicale d’une prémolaire peuvent produire un jetage unilatéral. Le diagnostic différentiel des rhinites et des sinusites, sur la base du seul examen clinique, est difficile. L’endoscopie, la sinuscopie, la scintigraphie ou encore la radiographie sont des techniques essentielles pour confirmer la présence d’une sinusite, et pour en déterminer l’étiologie. La tomodensitométrie, lorsqu’elle est disponible, est d’une grande valeur diagnostique. Lorsqu’un doute persiste sur la cause de la sinusite, la meilleure approche est de la traiter comme une sinusite primaire. À défaut de réponse au traitement, des examens étiologiques approfondis seront alors réalisés.

Mots clés : épistaxis, sinusite, troubles fongiques nasales, hématome ethmoïdal progressif

Abstract: The equine nasal cavity and associated paranasal sinuses are subject to a variety of disorders that primarily cause nasal airflow disorders or unilateral nasal discharge. Nasal paralysis, “false nostril flutter” and alar fold collapse can all cause loud respiratory noise production during exercise and these noises must be differentiated from each other, and also from noises caused by significant nasopharyngeal and laryngeal airflow obstructions. Most nasal haemorrhage (epistaxis) is not nasal in origin and when it occurs, most traumatic nasal and sinus epistaxis is self limiting. Progressive ethmoid haematoma lesions can be suspected by the chronicity and low grade, unilateral nature of the epistaxis and then confirmed endoscopically. Most unilateral purulent nasal discharge in
horses is due to sinusitis, mainly primary or dental sinusitis, but can also be caused by sinus cysts, sinus neoplasia and mycotic sinus infections. Less commonly, nasal mycosis and rostral cheek teeth apical infection will cause unilateral nasal discharge. Differentiating between the different causes of rhinitis and sinusitis on clinical grounds is difficult and endoscopy, sinoscopy, scintigraphy and radiography in particular, are essential techniques for confirmation of the presence of sinusitis, and then for determining its precise aetiology. Where available, computerised tomography (CT) is of great diagnostic value. If doubt remains on the aetiology of sinusitis – it is best treated as a case of primary sinusitis and in cases that do not respond to appropriate treatment, further aetiological investigations should be performed.

Key words: epistaxis, sinusitis, nasal mucosal disorders, progressive ethmoid haematoma

NASAL CAVITY

Nostril paralysis
The nostrils are one of the three unsupported structures in the upper respiratory tract (also the larynx and nasopharynx) and consequently, these 3 structures require active muscular contractions to dilate and maintain the patency of their lumina during fast exercise. Unlike the larynx, the nostrils are relatively rare sites of airflow obstruction during exercise. If unilateral facial paralysis is present, it is clinically obvious, as the horse has a twisted muzzle – pulled to the normal side. Nasal paralysis is usually the result of trauma, such as a kick to the side of the head (often only involving the buccal branches of the facial nerve), or to temporohyoid arthropathy (involves all branches - including ear and eyelid muscles). Most equine nostril paralysis is caused by reversible nerve damage.

High blowing (“false nostril flutter”)
During exercise, expiratory respiratory noises are louder than the inspiratory noises in normal horses. In horses that are “high blowing”, even louder and more vibratory expiratory noises are made, usually at the start of exercise. During high blowing the true nostril can clearly be seen to vibrate in most of these horses. These noises may be voluntary in some animals, e.g. with fear, aggression or excitement and may resemble snorting (forceful nasal expiratory sounds). High blowing noises are not clinically significant and some horse owners even consider these sounds desirable. They must, however, be recognised and differentiated from abnormal respiratory “noises”.

Alar fold collapse
This fleshy fold lies in the ventral nasal cavity and is attached rostrally to the false nostril and caudally to the ventral nasal concha. Occasionally (mainly in Standardbreds) this fold collapses into, and obstructs the nasal cavity at fast exercise, causing loud, vibrating noises, and possibly airflow
obstruction. Diagnosis can be confirmed by suturing the false nostrils open (using mattress sutures following local anaesthesia of the nostrils) and then exercising the horse to assess if this procedure removes the abnormal noises. If it does not, another site of airflow turbulence/obstruction should be sought, using treadmill endoscopy if possible.

False nostril cyst
The false nostril (whose function is unknown) normally constricts in a dorso-lateral direction during exercise, a process which also pulls the alar fold laterally and so enlarges the rostral nasal airways. In some horses, a epidermoid cyst develop in the false nostril subcutaneous tissues. If it enlarges sufficiently, it may lead to a soft, fluctuant swelling protruding externally in the area of the naso-maxillary notch, but they do not cause nasal airflow obstruction. These lesions can also be palpated protruding into the false nostril lumen and are pathognomonic in appearance and location (Fig 1).

Fig 1. An epidermoid cyst is present in the right false nostril of this horse.

Nasal Mucosal disorders
Accumulations of dry crusty casts on the swollen, sometimes ulcerated and crusted mucosa of the nostril and nasal cavities can occur in chronic grass sickness cases in the disorder of Rhinitis sicca. Rhinitis sicca may cause obvious nasal airflow disturbance with adventitious noise production and even dyspnoea, that may necessitate a temporary tracheostomy. If the animal recovers from the underlying grass sickness, the rhinitis sicca will regress. Some idiopathic headshakers may have swollen nasal mucosa – but the suggestion that this disorder is a seasonal nasal allergy has not been supported by any substantial evidence and other seasonal factors such as sunlight may be important aetiologically. Occasionally, some other horses will be found to have a similar swollen, pale nasal mucosa, with possible airflow obstruction, copious serous nasal discharge and possibly some headshaking – in the non-seasonal disorder of vasomotor rhinitis that can be induced by exercise or by other stresses.
Epistaxis
By definition epistaxis means bleeding from the nose. Spontaneous epistaxis from the nasal vasculature, as commonly occurs in humans, does not occur in the horse. In horses epistaxis is most commonly due to exercise induced pulmonary haemorrhage (EIPH) where it can be bilateral, or unilateral if only a small volume of blood appear at the nostrils. Less commonly, epistaxis will be caused by other disorders such as guttural pouch mycosis, ethmoid haematoma(ta) or from head trauma. The nasal mucosa has a very well-developed blood supply, because of its functions in modifying inhaled air and cooling the brain. Traumatic epistaxis can occur during naso-gastric intubation or nasal endoscopy, where the instrument has been inadvertently passed into the middle meatus, leading to trauma of the mucosal covering the nasal conchae (turbinates) or ethmoturbinates. Epistaxis may also occur from ventral meatus damage if an excessively wide nasogastric tube is used without adequate lubrication, or if the horse moves suddenly during such a procedure. Endoscopy is of little diagnostic value in the investigation of trauma to the nasal mucosal and may cause further haemorrhage and further distress the horse (and its owner).

Epistaxis can also occur after a heavy fall, which causes trauma to the head region, especially non-displaced fractures of the nasal, maxillary and frontal bones with subsequent haemorrhage into their underlying cavities or sinuses. In these cases, a lower grade epistaxis may be evident for up to 4-5 weeks as the sinuses gradually drain of blood. With such sino-nasal trauma, skull radiography may demonstrate the fractures in some cases, but will show fluid lines (blood) in multiple sinuses. Horses that suffer head trauma and over-extension of the head may also tear their rectus capitis muscles in the guttural pouches and bleed into their guttural pouches and thus have epistaxis. Endoscopy is the most useful diagnostic technique to investigate equine epistaxis and will usually identify the source of the haemorrhage, e.g. ethmoid haematoma; sinus haemorrhage; guttural pouch mycosis or EIPH.

Nasal neoplasia
Equine nasal tumours are uncommon and usually caused by very malignant neoplasms, such as carcinomas or osteogenic sarcomas that sometimes originate in the oral cavity and then invade the overlying nasal or sinuses. These tumours usually affect older animals, although younger horses will occasionally be affected. The clinical signs initially reflect local inflammation and secondary infection around the tumour and include chronic unilateral purulent nasal discharge, which may progress to a bilateral discharge, malodourous breath, epistaxis, secondary sinus empyema due to drainage obstruction, unilateral submandibular lymph node enlargement, nasal airflow obstruction, facial swelling, and halitosis, if the oral cavity is involved. Endoscopy may demonstrate an irregular pink or red fleshy mass (that may be covered with discharge) within the affected nasal cavity – but similar intra-nasal lesions may be caused by granulomas caused by rostral maxillary cheek teeth apical
infection. Transendoscopic biopsy of these lesions may obtain a suitable sample for histopathology. Radiographs and CT are of value in more advanced cases.

**Nasal foreign bodies**

These rare occurrences are usually due to twigs lodging in the rostral nasal cavity of, e.g. in hunters. The unilateral clinical signs result from secondary mucosal infection, i.e. a purulent unilateral nasal discharge that may temporarily respond to antibiotics. The foreign body may be seen directly or palpated, if in the rostral nasal cavity. Removal of the offending object under direct vision or endoscopically will resolve the problem.

**Nasal mycosis (Mycotic rhinitis)**

In Northern Europe, mycotic rhinitis is usually due to infection with *Aspergillus fumigatus* or *Pseudallescheria boydii* and may be more common in horses in a poorly ventilated environment that are fed on hay and bedded on straw, especially following sino-nasal surgery. The main clinical sign is a unilateral, malodorous, mucopurulent nasal discharge, and unilateral lymphadenitis. Epistaxis may occasionally occur. In warmer climates, equine mycotic rhinitis can be due to granulomas caused by *Phycomycosis, Cryptococcosis* or *Coccidioidymycosis*, which have different regional distributions. On endoscopy, mycotic rhinitis lesions resembles a ‘mouldy cheese’-like white, yellow or black coloured fungal plaques on the nasal conchae (turbinates) or ethmoturbinates, with underlying deep red ulcers visible when the mycotic plaque is removed.

Nasal swabs with isolation of a heavy and pure growth of potentially pathogenic fungus is usually diagnostic. However, lower numbers of fungi may be cultured from the nasal cavities of healthy horses. Serology is currently not of diagnostic value in horses. The diagnosis can be supported by visualising branching fungal bodies on smears or histological sections or fungal cultures of trans-endoscopically obtained biopsies.

**Rostral maxillary cheek apical abscess**

Infection of the first 2-3 maxillary cheek teeth usually results in a swelling possibly with a discharging sinus tract on the affected side of the face, usually a few cm rostro-dorsal to the rostral aspect of the facial crest. A small percentage of infected rostral cheek teeth will however, discharge medially into the nasal cavity, leading to a unilateral purulent, malodorous nasal discharge. Endoscopy may reveal a mucosal covered mass, purulent granuloma or pus in the rostro-lateral aspect of the middle meatus. Occasionally a fractured cheek tooth will cause an oro-nasal fistula (food in nasal cavity) and this problem can also occur following repulsion of a rostral maxillary cheek tooth. Examination of the cheek teeth for pulpar exposure (present in 50% of apically infected cheek teeth) is a most useful
technique. Occasionally other dental lesions such as a fractured tooth or diastema will be recognised. Very rarely, an incisor tooth will develop an apical abscess, with nasal fistula or apical granuloma formation and unilateral nasal discharge.

**Nasal septum deviation**
Deformity of the nasal septum usually as part of the “wry nose” syndrome, can cause an airflow obstruction. Endoscopy and dorso-ventral radiography will allow further assessment of the deformity and co-existent dental abnormalities will be present.

**PARANASAL SINUSES**

**Sinusitis (paranasal sinus empyema)**
Sinusitis is the most common cause of unilateral purulent or mucopurulent nasal discharge in the horse and can have multiple causes – see below. Whilst endoscopy will usually confirm the presence of sinusitis, radiography is more valuable in investigating its extent and aetiology. The septum between the rostral and caudal maxillary sinuses may be destroyed in sinusitis. Veterinarians must recognise and differentiate the common and harmless naso-frontal suture exostoses from sinusitis swellings. If a diseased sinus becomes swollen with pus, its thinner medial wall will tend to bulge into the nasal cavity – reducing airflow. Only in advanced cases will the thicker external wall, i.e. the maxillary bone, bulge laterally, leading to facial swelling and possible obstruction of the nasolacrimal duct, resulting in epiphora and such facial distortion is common with sinus cysts and sinus neoplasia – but rare with primary and dental sinusitis.

**Aetiology**
1. Primary (infective) sinusitis
2. Dental infection
3. Maxillary (sinus) cysts
4. Sinus neoplasia
5. Mycotic sinusitis

**Clinical signs**
Unilateral purulent nasal discharge
Unilateral submandibular lymph node enlargement
Possibly unilateral facial swelling
Possibly a malodour from affected nasal cavity
Possibly unilateral epiphora
Possibly unilateral nasal airflow obstruction
Possibly oral cavity changes (dental disorder or neoplasm)
Endoscopy will show discharge emanating from the drainage ostium of the maxillary sinuses at the caudal aspect of the middle meatus (“drainage angle”), confirming the presence of sinusitis – but not helping in deciding the aetiology (Fig 2).

![Endoscopic image of the caudal right nasal cavity of a horse suffering from sinusitis which shows pus draining (arrowheads) from the “drainage angle” of the right maxillary sinuses.](image)

**Fig 2.** Endoscopic image of the caudal right nasal cavity of a horse suffering from sinusitis which shows pus draining (arrowheads) from the “drainage angle” of the right maxillary sinuses.

Sinoscopy (direct endoscopy of the paranasal sinuses) is a technique that is performed through a small external opening made under local anaesthesia, usually into the frontal sinus. This is a simple technique that can reveal much useful information, provided the sinuses are not filled with liquid pus. In the sedated horse, insert 2-3 mls of local anaesthetic subcutaneously in the centre of the frontal sinus on the affected side, and then make a 2-3 cm vertical incision through the surgically prepared skin, down to the bone. Using a hand drill or a small trephine, an opening that is a few mm wider than the endoscope, is made in to the sinus in a ventro-lateral direction. Insert the endoscope in the frontal sinus (Fig 3) and proceed down to the fronto-maxillary opening and examine the maxillary sinus for the presence of cysts, liquid or inspissated pus, mycotic plaques or tumours.

![Sinuscopy of the left frontal sinus in the standing horse](image)

**Fig 3.** Sinoscopy of the left frontal sinus in the standing horse

**Primary sinusitis**
There is very poor natural drainage of the maxillary sinuses and thus indirectly of the frontal, dorsal conchal, ventral conchal, ethmoidal and sphenopalatine sinuses that all drain into the two (rostral and caudal) maxillary sinuses and from there, through narrow, mucosa lined passages into the nasal cavity. With upper respiratory tract infections (e.g. influenza or EHV4 infections), this drainage site becomes even less effective due to mucosal inflammation. Simultaneously, the infection will cause increased mucus production by the sinus mucosa and may cause deciliation of the sinus epithelial cells which normally transport mucus. If secondary bacterial invasion now occurs, sinus empyema will develop. This type of sinusitis will transiently occur in multiple sinuses with respiratory infections, but on occasions, possibly due to inspissation of pus or severe damage to the sinus drainage, it may become chronic (>2 months duration), i.e. chronic primary sinusitis in some horses.

In chronic cases, the ventral conchal sinuses that have particularly poor drainage are commonly affected by retention of pus, that often becomes inspissated and then can never be cleared by normal sinus drainage mechanisms. Careful radiological, sinoscopic and clinical examination should be performed to ensure that dental disease, maxillary cysts, tumours and mycosis are absent in horses diagnosed with primary sinusitis. In the absence of an obvious underlying lesion, despite the potential inaccuracy of sinus radiography, particularly with early dental infections, such a sinusitis may be termed a primary sinusitis. As noted, bony facial swellings are rarely present with primary sinusitis, but the nasal discharge is often malodorous, in contrast to common belief.

**Dental Sinusitis**

Dental sinusitis is caused by infection of the apices of the 3rd-6th maxillary cheek teeth, that lie within the rostral and caudal maxillary sinuses. Young adult horses are most commonly affected. A copious and malodorous nasal discharge is often present (due to anaerobic bacterial dental infection) and halitosis will occur if the dental infection involves the clinical crown. Facial swellings are seldom present. Latero-oblique radiographs are of most value to examine the dental apices. Dorso-ventral radiographs can outline medial swellings of the sinuses and in particular are the projection of choice to image the ventral conchal sinus. Scintigraphy is also of much value. Examination of the cheek teeth for pulpar exposure (present in 50% of apically infected cheek teeth) is a most useful technique and occasionally other dental lesions such as a fractured tooth or diastema (may cause an oro-sinus fistula – with food within the sinuse) will be encountered on oral examination.

**Sinus (maxillary) cyst**

These mucoid filled cysts develop in the maxillary and occasionally in the frontal sinuses in horses of all ages. If they enlarge sufficiently, they can cause occlusion of normal sinus drainage, pressure changes in the surrounding bones, inflammation and secondary sinus infection. They can occur in all
age groups, including foals. Very marked facial swelling, nasal airflow obstruction and epiphora are features of many cases. Nasal discharge may be of low volume or absent and if present, is usually less purulent and malodorous than with other types of sinusitis. Endoscopy may be limited by an inability to pass the endoscope up the affected nasal cavity due to medial sinus swelling, but if possible, will reveal a discharge from “the drainage angle” in most cases.

If facial swelling is present, the diagnosis can often be confirmed immediately by direct centesis of the cyst through the (usually thinned) overlying bones, eg using a 14 gauge needle. Lateral and dorso-ventral radiography are also most useful showing homogenous, rounded soft-tissue density lesions with a partially mineralised capsule, possibly surrounded by fluid lines - due to secondary sinus empyema.

Sinus Neoplasia
Like nasal neoplasia, these are uncommon lesions that usually affect older animals. They are usually very malignant tumours, especially carcinomas - including squamous cell carcinomas that develop in the hard palate and invade dorsally into the overlying sinus. Clinical signs are similar to those of nasal neoplasia, i.e. purulent nasal discharge and facial swelling, with nasal airflow obstruction in advanced cases. With advanced cases, it may be difficult to establish the origin of such tumours, which may involve much of the nasal and paranasal structures and the hard palate. Direct biopsy usually obtains better samples for diagnostic histology than smaller trans-endoscopic biopsies.

Mycotic Sinusitis
Many mycotic infections of the paranasal sinuses are secondary to sinus surgery, especially in damp temperature climates where animals are housed on hay and straw following surgery. Less commonly, an apparent primary maxillary or frontal sinus infection with e.g. Aspergillus sp will be found, usually on sinoscopy, eg if a sinus is examined because of a chronic non responsive sinusitis. The presenting signs are usually a malodorous nasal discharge. Isolation of low levels of Aspergillus in nasal discharge is not necessarily significant

ETHMOTURBINATES
“Progressive Ethmoid Haematoma”
An ethmoid haematoma is a slowly growing, persistent haemorrhagic polyp with the histological appearance of a chronic fibrotic haematoma. These lesions, which usually occur in adult horses, generally protrude rostrally from the ethmoturbinates into the dorso-caudal nasal cavity. Less commonly they grow laterally or dorsally into a paranasal sinus. These intra-sinus lesions bleed in small quantities over very long periods (even years) usually into the complex ethmoidal sinus, which
drains via the caudal maxillary sinus and the “drainage angle” into the nasal cavity. Some lesions may bleed directly from their capsule.

Lesions may slowly enlarge into the caudal nasal area and later possibly into the nasopharynx, frontal sinus, maxillary sinus and even the cranium, with secondary inflammation and infection developing around them. Facial swellings seldom occur. Now mucopurulent as well as haemorrhagic nasal discharge, and possibly airflow obstruction, facial swelling and neurological signs may occur. Ethmoid haematomas are the commonest cause of chronic unilateral epistaxis in the horse.

Endoscopically, the ethmoturbinates will change from their normal pink, finger like appearance to a single dark red, blue or speckled brown coloured swollen mass. With intra-sinus lesions, even if the ethmoturbinates appears endoscopically normal, radiography or sinoscopy may show the PEH lesions growing into the adjacent sinuses, but sinoscopy is a more useful diagnostic technique.

Suggested Reading List.


