CHRONIC NASAL DISEASE IN DOGS

Author : Alex Gough, Alasdair Hotston Moore

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Alex Gough, Alasdair Hotston Moore discuss disorders of the nares, looking at various diagnostic procedures and the treatment of aspergillosis, neoplasia and chronic rhinitis

NASAL disease is commonly encountered in dogs in the practice, but diagnosis and treatment can be frustrating and often unrewarding. This article will concentrate on chronic nasal disease, as it is generally more challenging to manage than acute disease.

The nasal cavity extends from the external nares to the choanae with a dividing septum. It contains the nasal conchae – cartilaginous scrolls covered with mucosa. Numerous delicate bony scrolls are known as ethmoturbinates and make up the ethmoidal conchae.

The air space is divided into three longitudinal nasal meatuses: dorsal, middle and ventral. The function of the nasal cavity is to warm and moisten air and filter out foreign bodies, and it also has a role in thermoregulation. The nasopharynx extends from the choanae to the intrapharyngeal ostium. The most important paranasal sinus in the dog is the frontal sinus.

History, examination and differential diagnoses

Historical and clinical signs of nasal disease include nasal discharge, sneezing and discolouration of the external nares. History taking should include questions on chronicity and progression of the disease, any changes to colour of the external nares and visible nasal mucosa, character of any discharge, and whether discharge is unilateral or bilateral. Physical examination of the oral cavity is useful – particularly in paying attention to the presence of dental disease.

Examining the nose is often limited to observing any discharge and changes to the external nares. Airflow through each nostril can be assessed with a wisp of cotton wool. Examination with an otoscope may allow visualisation of a limited amount of the nasal chamber, but is often hampered by discharge, and is commonly so resented by the dog that sedation or anaesthesia is required. If it is necessary to perform sedation or anaesthesia, it is recommended to prepare for further investigations, such as radiography or rhinoscopy, as using an otoscope alone is often unrewarding.

Differential diagnoses can be narrowed by historical and physical findings. Acute onset sneezing, particularly after a walk, increases the suspicion of a foreign body. A chronic unilateral nasal discharge, with or without blood, increases the suspicion of a nasal tumour or foreign body. Loss of pigmentation of the external nares raises the suspicion of aspergillosis. The main differential diagnoses for chronic nasal disease in UK dogs are foreign body, chronic rhinitis, dental disease, neoplasia and aspergillosis (Table 1).

In a UK study of 42 dogs with persistent nasal discharge (Tasker et al, 1999), 33 per cent were diagnosed with neoplasia, 24 per cent with inflammatory rhinitis, 10 per cent with periodontal disease, seven per cent with foreign bodies and seven per cent with aspergillosis. A more recent Canadian study (Meler et al, 2008) produced similar findings, with 24 per cent non-specific rhinitis, 15 per cent neoplasia, nine per cent aspergillosis, nine per cent cleft palate and four per cent periodontal disease.

A South African study (Lobetti, 2009) found 47 per cent of cases were neoplastic, with lymphoplasmacytic rhinitis in 20 per cent and fungal rhinitis in 11 per cent. In this latter study, neoplasia and lymphoplasmacytic rhinitis were diagnosed at a median age of 108 and 112 months respectively, whereas fungal rhinitis tended to be seen in younger animals with a median age of 53 months at diagnosis.

More uncommon causes of chronic nasal disease in dogs include nasal polyps (Holt and Goldschmidt, 2011) and nasal mites (*Pneumonyssoides caninum*). The latter condition is common in Sweden but has also been reported in the UK (Wills et al, 2008).

Diagnostic tests

• advanced imaging

Magnetic resonance imaging (MRI) and computed tomography (CT) can provide valuable information about the structure of the nasal cavity. Ultrasonography of this area is not possible as it is surrounded by bone, and radiography provides limited soft tissue detail.

However, MRI and CT both provide excellent images of the soft tissue and small bones, and can be used to help distinguish between:

• aspergillosis, which tends to show a destructive pattern;

• neoplasia, which tends to show a soft tissue mass often accompanied by bony destruction (Figure 1); and

• chronic rhinitis, which will usually show only an increase in retained secretions (Figure 2).

Differentiating retained secretions from a soft tissue mass can sometimes be challenging, but the presence of contrast uptake within a region is indicative of living tissue, as opposed to secretion. Miles et al (2009) compared histological diagnosis with MRI findings and found that inflammatory disease was significantly associated with lack of a mass effect, but presence of a mass was not diagnostic of neoplasia. However, neoplasia was associated with cribriform plate erosion, vomer bone lysis, paranasal bone destruction, sphenoid sinus invasion and nasopharyngeal invasion.

Occasionally, foreign bodies will be detected on advanced imaging, but rhinoscopy is superior for this. Advanced imaging allows assessment of the frontal sinuses, which is more sensitive than radiography.

In terms of sensitivity for nasal imaging, there is little difference between MRI and CT. CT is slightly better for detection of bone lysis, and MRI is slightly more sensitive for detecting small amounts of fluid (Drees et al, 2009). MRI is also better at detecting intracranial extension of neoplasia, although if the animal goes on to be treated with radiotherapy, this finding may not significantly alter the outcome (Agthe et al, 2009).

• Radiography

Radiography is often useful in diagnosing chronic nasal disease, although in recent years it has become increasingly supplanted by advanced imaging techniques. In many cases, there are radiological findings that can be considered diagnostic – therefore, radiography is recommended as part of the initial investigation.

The most useful radiographic projection is the dorsoventral intraoral. If possible, use of non-screen film is ideal, since the resolution is superb and it can be placed caudally into the mouth to capture most of the nasal cavity. Film in a cassette (and digital or computed radiography) can nonetheless be used to make useful images. A second projection, which is particularly useful, is the rostrocaudal (skyline) view of the frontal sinuses. The lateral projection rarely adds to the diagnosis.

Chronic rhinitis has nonspecific radiological features: a blurring of the turbinate pattern, due to accumulation of discharge between the scrolls, together with mucosal swelling. It is usually bilateral. Frontal sinus pathology is rare.

Aspergillosis causes turbinate destruction without soft tissue proliferation. Typical features on the intraoral view are areas of radiolucency affecting the rostral and mid parts of the nasal chambers, unilaterally or bilaterally (Figure 3). There is rarely significant loss of the supporting structures of the nose (palate, maxilla) or periosteal reaction of these bones. However, increased opacity within one or both frontal sinuses is common, together with periosteal reaction and thickening of the bony roof of the nasal chambers.

The typical neoplasm of the nasal chambers is adenocarcinoma (or other carcinoma). This disease causes turbinate destruction and replacement with soft tissue (Figure 4). The resulting increase in radiodensity in the nasal chambers (initially unilateral, but bilateral in advanced cases) is often described as producing an appearance of ground glass (monotonous grey areas). The change is centred in the caudal parts of the nasal chamber and often affects more than half of the volume at the time of diagnosis.

On high-quality films, patchy radiolucency of the supporting bones may be seen. There is often an increased density in the frontal sinus on the affected side(s) due to tumour extension or accumulation of discharge following occlusion of the nasofrontal ostium.

Nasal foreign bodies are rarely radiodense enough to be seen. The clinician may, however, recognise areas of ill-defined, localised increased soft tissue density in the nasal chamber, representing discharge and oedema around a foreign body.

Dental rhinitis causes soft tissue density in the nasal chamber alongside the affected dental arcade. The clinician may also appreciate widening of the periodontal space, tooth loss or change in crown or root outline. Further radiographic projections are indicated in suspicious cases, together with a detailed oral examination.

• Rhinoscopy

Rhinoscopy is a particularly useful diagnostic procedure. A complete examination includes both anterior rhinoscopy via the nostrils and retrograde examination of the nasopharynx. Both require general anaesthesia for patient comfort and safety (and protection of the equipment).

Selecting the right equipment is critical for success. Anterior rhinoscopy is most useful when a rigid endoscope is used: in large dogs a 4mm scope can be used, but in other cases a 2.7mm scope is required. Although rhinoscopy can be performed “dry”, with no irrigation and without a sheath, most clinicians prefer to use an operating sheath with the scope, which allows constant irrigation and passage of biopsy forceps through an instrument channel. Instrumentation marketed for cystoscopy is ideal. Use of a camera system is recommended. Rhinoscopy should be completed in a systematic manner to examine each meatus. In larger dogs, or when turbinate destruction is present, it may be possible to enter the nasopharynx and/or frontal sinus.

Typical rhinoscopic findings in disease are:

• presence of localised collection of mucus or pus containing brown material (foreign body);

• turbinate destruction with areas of cavity formation (destructive rhinitis – typically, aspergillosis);

• presence of “fluffy” white plaques (aspergillosis, invariably with cavitation); or

• proliferative frond-like soft tissue (nasal neoplasia).

A flexible endoscope is used for retrograde rhinoscopy. A bronchoscope is used in very small dogs, but in most, a small gastroscope is preferred, since this has superior angulation and better optical qualities. The easiest method is to retroflex the scope before placing it into the dog’s mouth and then “hook” it above the soft palate.

Retrograde rhinoscopy reveals a mass extending through one internal naris in many cases of neoplasia (Figure 5) and unilateral discharge in neoplasia, intranasal foreign bodies or aspergillosis. Nasopharyngeal foreign bodies are usually obvious, although they may be obscured by mucus.

• Nasal flushing

Cytological findings from nasal flushes are generally considered to be less sensitive and specific than histopathological findings from biopsies. Occasionally, forceful flushing will expel pieces of tissue that can be submitted for histology. Since chronic nasal disease is rarely a specific bacterial infection, microbiology is of limited value.

Fungal culture is potentially misleading, since *Aspergillus* is a common environmental organism and is sometimes cultured from nasal flushes taken in other diseases.

• Nasal biopsies

Nasal biopsies are most useful for diagnosing nasal neoplasia, although when typical radiographic changes are present, a tissue diagnosis is only of academic interest unless the owners are considering advanced therapy, such as radiotherapy.

When rhinoscopy clearly demonstrates proliferative tissue, biopsy forceps can be placed, under visual guidance, to the area of interest. As a general rule, the larger the forceps, the more reliable the pathological diagnosis: if a small cystoscope is used, the instrument channel will not accommodate forceps of a sufficient size and larger forceps are placed alongside the scope.

In animals with widespread radiographic changes suggestive of neoplasia, an excellent alternative is suction biopsy: an 8FG end hole, stiff, plastic catheter (shortened urethral catheter) is passed to

the level of the medial canthus and firm suction used to harvest a core of tissue. Biopsies are of much less use for aspergillosis. Unless a visually guided biopsy from a fungal plaque is taken, the disease is unlikely to be found, since relatively small areas of mucosa are infected (sometimes only within the frontal sinus). Grab biopsies are used for the diagnosis of chronic rhinitis, although the pathology is non-specific.

Treatment

• Neoplasia

Nasal neoplasia surgery is considered ineffective, with survival times comparable to those observed in untreated dogs. Chemotherapy can be used in nasal lymphoma, although, if this is solitary, radiotherapy may be more effective. However, the literature on this subject is sparse. Most nasal neoplasia is best treated with radiotherapy. Median survival times vary in the literature, depending on protocol, study population and whether re-irradiation is performed on recurrence, ranging from 146 days (Gieger et al, 2008) to 927 days (Bommarito, 2011).

• Chronic rhinitis

Chronic rhinitis is a frustrating condition to treat. Control may be achieved with long-term corticosteroids, but sometimes no response is achieved. Steam inhalation can sometimes help to moisten and clear dessicated nasal secretions.

• Aspergillosis

Historically, various treatment regimes have been used for aspergillosis with varied success. No agents are licensed for this purpose in the UK. Notably, systemic therapies appear to have a limited efficacy, probably because the organism is present on the surface of the tissues and may be poorly accessible to antifungal drugs carried in the plasma.

Of the commonly available agents, itraconazole is perhaps the most useful as it is relatively non-toxic and moderately efficacious (the expected response rate is around 60 per cent).

More effective are topical therapies and, for some years, the standard treatment has been clotrimazole. It is most useful delivered in an “invasive” fashion (through instillation into the frontal sinuses, rather than via the nostrils).

Several regimes are described, but the most reliable is through surgical access to the sinuses (for example, by trephination). Large volumes of saline are used to flush the sinuses and nasal chambers, followed by 1.0ml/kg of clotrimazole solution, and then the frontal sinuses are filled with clotrimazole ointment. Most dogs are successfully treated by a single infusion, but it is repeated at three-week intervals – twice in animals with persistent signs (Sissener et al, 2006).

Alternatives to clotrimazole are reported, but should be reserved for the rare cases that fail to respond and after discussion with clinicians experienced with such cases.

Conclusion

Chronic nasal disease in dogs can be challenging to treat and diagnose. However, with a rigorous approach, a diagnosis can often be made, allowing the most appropriate treatment to be selected.

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