WHAT IS YOUR DIAGNOSIS?

A 5 year old crossbreed dog was presented to the R(D)SVS Internal Medicine Service for investigation of mucopurulent left sided nasal discharge, sneezing and nasal and occasional stertor of 18 months duration. There had been a temporary improvement with short courses of antibiotics. The dog had been otherwise well, with excellent demeanour and appetite as usual. The dog had been in close contact with horses for several months prior to the onset of clinical signs.

On presentation, the dog was bright, alert and responsive. Oral mucous membranes were pink, with a capillary refill time of 1 second. Heart rate was 140 beats per minute, with synchronous femoral pulses of good quality, a regular rhythm, and no murmurs detected. The dog was panting, but there was no associated increase in effort. Thoracic auscultation and percussion were within normal limits. Abdominal palpation and peripheral lymph nodes were unremarkable. Rectal temperature was 38.1°C.

Nasal airflow was reduced on the left side, but present on the right. There was no nasal discharge present, and no sneezing was observed. There was no nasal de-pigmentation and no facial pain or asymmetry. There was normal retropulsion of both globes. Oral examination revealed no evidence of a tooth root abscess or oronasal fistula.

1) What are your main differentials for this case?

2) How would you evaluate the case further?
1) Differential diagnosis

1. The main differentials for unilateral nasal discharge, sneezing, loss of airflow and stertor are:

   a) Neoplasia e.g. adenocarcinoma, squamous cell carcinoma, chondrosarcoma, osteosarcoma, fibrosarcoma, lymphosarcoma
   b) Foreign body
   c) Inflammatory e.g. lymphoplasmacytic rhinitis, allergic rhinitis, nasopharyngeal stenosis, polypoid rhinitis
   d) Infectious e.g. fungal rhinitis (aspergillosis), bacterial rhinitis (Streptococcus equi subsp. zooepidemicus)
   e) Oral disease e.g. tooth root abscess, oronasal fistula

   • The unilateral lack of nasal airflow in this case may be more consistent with a space occupying lesion (e.g. neoplastic mass), although nasal airflow can be hard to assess in the presence of thick, profuse nasal discharge.
   • The presence of stertor is suggestive of nasopharyngeal involvement.

2) Evaluation

Clinical pathology (haematology, biochemistry, and urinalysis) is rarely helpful in determining the aetiology of nasal disease. However, investigation of nasal disease requires general anaesthesia, and these tests help to evaluate overall health status and may be useful for detecting systemic disease presenting with predominantly nasal signs e.g. vasculitis, hyperviscosity, hypertension, haemostatic disorders, infections of various causes.

   • Tests of coagulation should be performed prior to nasal biopsy:
     - Buccal mucosal bleeding time
     - Coagulation times (PT and APTT) or PIVKA
     In cases of epistaxis, these tests should be performed at the outset, as well as measurement of systolic blood pressure to rule out hypertension.

In general, investigation of nasal disease requires general anaesthesia for:

   • Examination of the oral cavity
   • Imaging:
     - Skull radiographs: standard views include right or left lateral, intraoral, dorsoventral, ventrodorsal open mouth, and rostrocaudal (for frontal sinus evaluation). Lateral oblique views are required to evaluate the dental arcades.
     - CT: advanced imaging of this form has the major advantage of obtaining detailed images of the nasal cavity and associated structures without the problem of superimposition.
   • Rhinoscopy/nasopharyngoscopy
     - Diagnostic (e.g. visualisation of fungal plaques, foreign bodies, mass lesions)
     - Therapeutic (e.g. removal of foreign bodies or fungal plaques, flushing of excessive secretions)
   • Nasal biopsy
     - Rhinoscope-guided or blind biopsies from both nasal cavities, and from any nasopharyngeal lesions
     - Biopsies should be submitted for histopathology and culture (bacterial and fungal)
- It should be remembered that even with obvious unilateral clinical signs, both sides of the nose should always be examined. Where disease is limited to the frontal sinus, trephination for sinuscopy and biopsy may be required.

In this case, investigations were carried out as follows:

- Routine haematology and serum biochemistry was unremarkable.
- A coagulation profile revealed reference range PT, APTT, and fibrinogen. Buccal mucosal bleeding time was within normal limits.
- Pre and post contrast CT scans of the head were carried out under general anaesthesia (figure 1). These revealed obliteration of nasal turbinates in left nasal cavity by fluid and mucosal contrast enhancement in this area. There was no visible mass, no evidence of turbinate destruction and no evidence of a foreign body.
- Rhinoscopy was carried out under the same anaesthetic. Retroflexed examination was unremarkable. Normograde rhinoscopy revealed mucous bilaterally with greater accumulation of mucous on the left. The mucosa appeared irregular, roughened and friable on the left side with an increased tendency to haemorrhage. There was no evidence of ulceration, masses, fungal plaques or foreign bodies. Nasal biopsies were collected from the left and right nasal cavities.
- Histopathology of right nasal biopsies revealed mild to moderate, chronic active, diffuse, rhinitis with transepithelial, neutrophilic trafficking. Histopathology of the left nasal biopsies revealed moderate to severe, chronic active, diffuse, rhinitis with bone remodelling, glandular hyperplasia, transepithelial neutrophilic & lymphocytic trafficking.
- Fungal culture of the biopsies was negative. Bacterial culture yielded a moderate and mixed bacterial growth, with *Streptococcus equi* subspecies *zooepidemicus* as the predominant organism which was sensitive to all antibiotics tested except clindamycin (intermediate sensitivity).

**Treatment:**

The dog was treated with a six week course of clavulanate potentiated amoxicillin 12.5mg/kg q 12 hours PO and meloxicam 0.1 mg/kg q 24 hours PO which resulted in resolution of the nasal discharge and sneezing. The longer term prognosis is unclear since reoccurrence of the clinical signs following completion of antibiotics is a concern.
Discussion

This case highlights the value of a combined diagnostic approach involving advanced imaging, rhinoscopy, histology and microbiology in the assessment of dogs with chronic nasal discharge. In many cases of chronic nasal discharge, bacteriology can be unhelpful in establishing the primary cause of the nasal discharge since cultures may only identify secondary pathogens or commensal organisms. However, this case is an example of how bacteriology can be crucially important in identifying the aetiology in some cases of chronic nasal diseases.

*Streptococcus equi* subspecies *zooepidemicus* is a beta haemolytic, Lancefield group C streptococcal bacterium that is a common cause respiratory infections in horses. It is not considered to be part of the normal mucosal flora of dogs (i.e. primary pathogen). In dogs, it is associated with acute necrotising haemorrhagic pneumonia, septicaemia and canine infectious respiratory disease complex. It is also potentially zoonotic; cases of arthritis, meningitis, bacteraemia, nephritis reported in humans in close contact with horses, and there has been one report of zoonotic transmission in a dog.

There has been a previous report of one case (dog living on an equine stud farm) of chronic rhinitis attributed to *Streptococcus equi* subspecies *zooepidemicus*

- 10 month old FN cross breed, 7 month history bilateral nasal discharge
- temporary improvement upon 5 day course of clav pot amoxicillin
- haematology – eosinophilia
- rhinoscopy – lysis of turbinates in both nasal cavities, thick white mucus, thickened hyperaemic mucosa, diffuse polyps and numerous patchy tenacious mucopurulent plugs
- nasal swabs (not biopsies) and 16S rRNA PCR - *Streptococcus zooepidemicus*
- histopathology chronic diffuse lymphoplasmacytic rhinitis with numerous intravascular eosinophils and severe exocytosis of neutrophils through epithelium
- treatment – clavulanate potentiated amoxicillin and marbofloxacin 1 month
- clinical signs resolved completely

There has also been a report of 3 household dogs with isolation of S.zooepidemicus (living with owners on 2 stud farms); one with severe pneumonia, one (same household) asymptomatic, and the third (separate household) chronic rhinitis.

In cats, one report of rhinitis and meningitis in 2 shelter cats (separate facilities), due to *Streptococcus equi* subspecies *zooepidemicus*. Both cats had acute onset illness with vague clinical signs (cat A) and blindness (cat B) and both died within 24 hours. Meningitis was thought most likely a result of olfactory route of infection, secondary to rhinitis (acute).

References


Figure 1: Pre-contrast CT image of nasal cavity revealing obliteration of nasal turbinates in left nasal cavity by fluid and mucosal contrast enhancement.