Diagnostic and therapeutic approach to upper airway obstructions

Gerhard Oechtering
University of Leipzig, Veterinary Faculty, Small Animal Department, ENT-Unit
Leipzig, Germany

Overview of the Issue

The diagnostic approach to obstructions of the upper airways bases on both a thorough anamnesis (including among other things questions on breathing at rest, after exercise, during sleep, through mouth or nose) and a careful adspection and listening to breathing sounds and possible stridores. Distinguishing stenoses of the oro-laryngeal airway from those of the nasal and nasopharyngeal airway is a primary goal and can be very helpful for planning subsequent examinations.

If an obstruction of the nasal and or nasopharyngeal airway is suspected, usually an examination under anesthesia is necessary. These passageways are not accessible for the naked eye and we need diagnostic aids like endoscopy and/or computed tomography. Plain radiographs of this region can be helpful but usually are clearly inferior to CT information.

Key Clinical Diagnostic Points

In dogs and cats, endoscopic examination of the upper respiratory tract from the nares down to the carina is done primarily with ridging endoscopes. Several factors determine the quality of the results.

1. Quality of endoscopes, light source, camera and documentation unit
2. Endoscopic experience and technique of the examiner
3. The examiners anatomic knowledge of the specific region
4. Patient preparation and positioning
5. Anesthesia and ventilatory support
6. Variety of supporting equipment

Endoscopes for anterior and posterior rhinoscopy differ in size and angle of view. Common types are:

1. Diameter: Ø 2.7 mm (most dog breeds) and 1.9 mm (small dogs and cats)
2. Angle of view: 0° and 30°, for retrograde 120°

Supporting equipment either improves image quality or helps to grab or manipulate tissue. Generally spoken, suction is preferable to flushing, independent on the quality of fluid that has to be removed.

1. Anti-fogging solution
2. Suction unit
2.1. various suction pipes and tubes
2.2. adjustable suction power
3. Various types of forceps or manipulating devices

Key Therapeutic Points

Rhinoscopy
Nasal Entrance: Nares & Vestibulum

Adhesion and Stenosis after Trauma

Aetiology:

Trauma: e.g. bite and gunshot wounds, injury from car accident
Iatrogenic: Incorrect nares enlarging surgery, excessive use of thermal energy, rough manipulation of pre-damaged nasal entrance (e.g. aspergillosis)

Clinical Findings: Stridor nasalis, in pronounced cases mouth breathing during heat or exercise

Endoscopic Findings:

Normally rostral stenosis of the nares is detectable with the naked eye.
However, adhesions and stenosis of the vestibulum are better diagnosed with endoscopy.

Therapeutic plan: Surgical enlargement, tube-stenting for at least 14 d

Hereditary Stenosis

Aetiology: Brachycephalic dog & cat breeds

Clinical Findings: Stridor nasalis, in pronounced cases mouth breathing during heat or exercise

Endoscopic Findings:

Normally rostral stenosis of the nares is detectable with the naked eye.
However, adhesions and stenosis of the vestibulum are better diagnosed with endoscopy.

Therapeutic plan:

Surgical enlargement – Nasal vestibuloplasty

Rhinoscopy
Nasal Cavity

Aetiology:

Foreign body
Oro-nasal dental problem
Tumour
Congenital malformation of turbinates (Brachycephaly)

Clinical Findings:

Stridor nasalis, in pronounced cases mouth breathing during heat or exercise
Nasal discharge possible

Endoscopic Findings:

Obstructed nasal passageways, detectable with anterograde and/or retrograde rhinoscopy.
Ventral nasal meatus is most important!

Diagnostic plan:

Detect underlying cause: preceding computed tomography is often very helpful.
Exclude possible dental problems.
Clean area of interest (suction, flushing only if necessary)
Explore nasal meatus, Biopsy, …

Therapeutic plan:

Surgical extraction/enlargement of obstructing cause, remove underlying problem.

Rhinoscopy

Nasal Exit: Meatus Nasopharyngeus and Choanae

Aetiology:

Foreign body
Tumour
Congenital malformation of the nasal turbinates
Obstructing growth of malformed Caudal Aberrant Turbinates (CAT) in brachycephalic breeds
Congenital malformation of the nasopharyngeal meatus (osseous) (e.g. some Toy breeds)
Acquired stenosis of the nasopharyngeal meatus
(Foreign body?, Reflux during anaesthesia?, …?)

Clinical Findings:

Stridor nasalis, in pronounced cases mouth breathing during heat or exercise
Nasal discharge possible

Endoscopic Findings:

Endochoanal obturation/stenosis
Post-rhinoscopy often more valuable than anterograde Endoscopy.

Diagnostic plan:

Detect underlying cause: preceding computed tomography is often indispensable.
Clean area of interest (suction, flushing only if necessary)
Explore nasal meatus, Biopsy, …

Therapeutic plan:

Surgical extraction/enlargement of obstructing cause, remove underlying problem.

Pitfalls:

Within the nasopharyngeal meatus there is a high risk of re-stenosis after circular mucosal damage.
Temporary stenting might be necessary.

Nasopharynx (Pars nasalis pharyngis)

Aetiology:

Foreign body
Nasopharyngeal Polyp (cat)
(Palatal) tumour
Expanding middle ear process (e.g. Cholesteatoma)
Nasopharyngeal stenosis (soft tissue, often cats, rostral or caudal manifestation, related to mucosal inflammation of various underlying causes)

Clinical Findings:

Stridor pharyngealis (Stertor, Snoring)
In pronounced cases mouth breathing, particularly during heat or exercise
Nasal discharge possible

Endoscopic Findings:

Clean area of interest (suction – anterograde and retrograde, flushing only if necessary)
Postrhinoscopy: nasopharyngeal mass or stenosis

Diagnostic plan:

Detect underlying cause: preceding computed tomography is often helpful and can be indispensable.
Posterior & anterior rhinoscopy
Explore nasopharynx, (biopsy), …

Therapeutic plan:

Nasopharyngeal polyp:

Careful and very slow extraction by oral approach
Retrograde endoscopic control of nasopharynx and openings of the tuba auditiva
Depending on middle ear findings (endoscopy and/or CT): otoscopic intervention removing tissue from the bulla

Nasopharyngeal stenosis:

Surgical enlargement
Tube-Stenting for at least 14 d

Palatal tumour:

Biopsy
Oral surgical approach

Summary

1. Key point 1
   Distinguishing stenoses of the oro-laryngeal airway from those of the nasal and nasopharyngeal airway is a primary goal and can be very helpful for planning subsequent examinations
2. Key point 2
   Both, careful adspection and listening to breathing sounds and stridores facilitate localization of the obstruction site
3. Key point 3
   Depending on the severity of the clinical signs an early decision for an extended examination involving endoscopy and/or computed tomography can be crucial
4. Key point 4
   The success of endoscopic diagnostic and interventional procedures is largely dependent on experience, technique and anatomic knowledge of the examiner
5. Key point 5
   Prevention of re-stenoses is a major prognostic factor after opening of stenoses in upper airways