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Brachycephalic Airway Disease: Surgery and Prognosis

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Primary problems include stenotic nares, elongated soft palate, redundant pharyngeal folds and tracheal hypoplasia.

Exacerbated negative airway pressures lead to secondary events such as eversion of the laryngeal saccules and laryngeal collapse. Hiatal hernia, tracheal collapse and epiglottic entrapment may also occur.

Clinical signs are chronic and progressive and include snoring, coughing, respiratory stertor/stridor, dyspnoea, regurgitation, vomiting, exercise intolerance, cyanosis and syncope. Corticosteroids, oxygen, cage rest, weight loss and keeping the patient cool may be palliative.

Surgical treatment includes correction of stenotic nares and resection of elongated soft palate, laryngeal saccules and excessive palatopharyngeal folds. Laryngeal collapse is a serious secondary complication of BAOS and results from softening of the laryngeal cartilage subsequent to chronically exaggerated intraluminal airway pressures. There is no specific treatment for laryngeal collapse. Partial laryngectomy can be associated with serious complications. Laryngeal lateralization does not address the major problem; the loss of cartilaginous support of the laryngeal structures. Temporary tracheostomy is helpful in dogs with mucosal edema following surgery, but only permanent tracheostomy is likely to provide long-term relief.

Stenotic nares should be treated at the earliest possible opportunity. The nasal plane and alar cartilages are prepped with dilute chlorhexidine. Application of ice may reduce the amount of bleeding. The incision sites should be determined prior to the first incision, as bleeding will make visualisation difficult. The ventral alar cartilage is grasped with a toothed thumb forcep and a fine scalpel blade used to incise down either side of the forceps to remove a wedge. The incision is closed with 2 or 3 simple interrupted absorbable sutures, drawing the alar fold laterally and enlarging the nares. A relatively small increase in diameter results in a large increase in area of the nares, with marked improvement in air flow. Owners usually comment on an immediate improvement in the character of their dog’s breathing.

Over long soft palate leads to snoring, gagging, coughing and regurgitation due to pharyngeal irritation. The caudal edge of the soft palate should just adhere to the epiglottis, without extending into the laryngeal lumen. The soft palate is grasped with forceps and unfolded to assess the true length as some animals have mucosal flaps that curl up into the nasopharynx when the soft palate is retracted. The pharynx is swabbed with topical lignocaine, and surgical gauze packed around the larynx to reduce blood contamination of the trachea.

The soft palate is resected at the level of the tonsils, so that it touches the epiglottis when the tongue is in a natural position. It is incised from one edge to the centre using scissors, then the oral and nasopharyngeal mucosa are sutured using a continuous layer of fine
absorbable suture material. The second side of the soft palate is then incised and the suture continued across. Bleeding is usually minimal, but occasional animals have a prominent artery on either side. If significant bleeding occurs, the pharynx should be packed with surgical gauze for 10 minutes. Obviously, patients should have a cuffed endotracheal tube in place while the procedure is being performed! Dogs with BAOS often also have redundant mucosa or exuberant mucosal folds in the pharynx and caudal nasopharynx. These folds may obstruct the nasopharynx or opening to the oesophagus, leading to snoring, gagging and coughing. These folds, combined with the small calibre of the airways, often means that dogs will continue to have stertor and varying degrees of upper airway obstruction and owners should be warned of this.

Eversion of the laryngeal saccules causes sudden deterioration as animals age. The saccules appear as puffy, glistening white structures in the ventral glottis, obscuring the vocal folds. Resection of the saccules provides significant improvement, but the precipitating primary problem, such as stenotic nares or long soft palate, should always be addressed as well. Visibility is often difficult in dogs with cramped pharynxes and the larynx may be obscured by secretions. Adequate lighting, suction and instrumentation must be available. Long handled toothed forceps are used to grasp the saccules, and curved endosurgical scissors with rotating blades used to cut the saccule at its base. Long handled scissors can also be used but visibility is not good and it can be difficult to manipulate them into the right plane. Care should be taken not to cut the vocal fold, and not to damage the cartilage of the larynx. Bleeding stops quickly when a long-handled cotton swab is applied. The endotracheal tube should be removed for this part of the procedure. The dog is not intubated again prior to recovery unless absolutely necessary to reduce airway irritation.

Laryngeal collapse should not be confused with laryngeal paralysis. Laryngeal collapse is not well addressed by laryngeal lateralisation as the cartilaginous structure of the larynx is compromised, rather than arytenoid movement. Similarly, partial laryngectomy will often destabilise the larynx further although some dogs have shown reasonable long-term response after the procedure. A recent study at the UVCS has shown that laryngeal collapse occurs in up to 75% of pugs with BAOS. Interestingly, dogs with laryngeal collapse rarely died as a result of their airway disease. Dogs with laryngeal collapse experienced a clinical improvement following surgical correction of abnormalities such as stenotic nares, overlong soft palate and everted laryngeal saccules.

Veterinarians should be careful when dealing with patients presenting for BAOS. Airway obstruction may be more severe than first thought. Anaesthesia may exacerbate airway obstruction by reducing the patient’s ability to keep their airway open. Owners should also be prepared for possible temporary tracheostomy should laryngeal collapse be present. Corticosteroids are not given routinely. However, if mucosal edema is evident in dogs with laryngeal collapse, or significant airway obstruction persists or worsens during recovery from anesthesia, a single dose of a short-acting corticosteroid is given. If respiratory obstruction does not improve within 20 minutes, temporary tracheostomy is considered. Preliminary work using continuous positive airway pressure applied via a face mask in recovery is encouraging.