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Brachycephalic Obstruction Airway Syndrome– Anatomical Predisposition and Surgical Interventions

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Introduction

Brachycephalic Airway Obstructive Syndrome (BAOS) is a progressive, congenital condition predominantly affecting brachycephalic dog and cat breeds (pugs, bull dogs, persian cats etc) characterized by a constellation of anatomical abnormalities in the upper respiratory tract. These include hypoplastic trachea, stenotic nares, elongated soft palate, everted laryngeal saccules, which collectively result in varying degrees of airway obstruction. The syndrome is a direct consequence of selective breeding for shortened craniofacial features without concurrent reduction in surrounding soft tissue, often at the expense of functional respiratory anatomy. BAOS is associated with significant clinical morbidity, including respiratory distress, exercise intolerance, thermoregulatory dysfunction and increased anesthetic risk. As the prevalence of brachycephalic breeds continues to rise globally, there is an urgent need for heightened awareness, early diagnosis and evidence-based management strategies to mitigate the health burden of this condition. This article aims to review the etiology, clinical significance and its diagnostic approaches and current therapeutic options for Brachycephalic Airway Syndrome, with an emphasis on improving patient outcomes and promoting responsible breeding practices.

Affected dogs

This condition is seen most frequently in English bulldog, pug, boston terrier, French bull dog etc. It may also see in boxer, Pekingese, bullmastiff, shih tzu, etc.

Etiology

In brachycephalic dogs, selective breeding will cause progressive shortening of the skull bones without reduction of softpalate results in conformational anomalies termed as brachycephalic obstruction airway syndrome.

Specifically, the condition refers to the combination of three functional abnormalities:

- Stenotic nares

  Referring to narrow nostrils and small nostril openings, this causes obstructed airflow, reduced nasal breathing results in hypernea and dyspnea thereby increased susceptibility to overheating.
- Elongated soft palate

  Brachycephalic dogs have shorter snouts, the softpalate is disproportionately long and excess tissue flaps into the throat, producing snoring sounds and obstructing airflow to the windpipe and lungs.

- Everted laryngeal saccules

The stenotic nares and an elongated softpalate in brachycephalic dogs increase the effort required for breathing, which may lead to eversion of the laryngeal saccules, further obstructing the airway.

Additional factors that may worsen airway narrowing are:

- Collapse of the laryngeal cartilages
- An abnormally large tongue occupying excess space in the oral cavity
- Hypertrophied or outwardly prolapsed tonsils

Pathophysiology

In brachycephalic dogs, primarily inherited defects such as elongated and thickened soft palate, stenotic nares, protruding nasal turbinates, hypoplastic trachea and macroglossia compromises the airway. This increased respiratory efforts leads to next level of secondary changes including bronchial collapse, everted laryngeal saccules, edema and subepiglottic cysts, all of these will further block airflow. In addition to this many affected dogs show gastrointestinal abnormalities like gastric retention, gastric oesophageal reflux, pyloric stenosis etc.

Clinical significance

Symptoms

- Snoring
- Breath sounds with obstruction
- Choking
- Persistent throat sounds
- Laboured breathing
- Rapid breathing
- Intolerance to activities like exercise
- Distended abdomen
- Overheating
- Pale or blue gums
- Collapse

How to prevent BOAS Symptoms in dogs?

Managing your dog's weight

Limiting exercise in hot weather

Avoiding stress and overexertion

Providing a cool, calm environment

Regular veterinary check-ups to monitor airway health.

Diagnosis

Diagnosis is primarily based on the dogs breed, age, characteristics clinical signs and physical examination findings. Most dogs are diagnosed between one and four years of age. Males and females are affected equally.

Further assessment involves, examination of the softpalate and laryngeal saccules of your dog by administration of light anesthesia. The tracheal diameter of the neck and chest region can be evaluated by radiographs, and also with other advanced technologies like endoscopy or CT scan of the upper airway.

Treatment

In mild cases, supportive care is often effective.

Maintain a healthy body weight

Reduce excessive panting

Prevent exposure to extreme heat and humidity

Moderate exercise

Avoid stressful situations

Replace neck collor with harness

Advanced cases need surgical interventions.

The BOAS Surgery Procedure

BOAS surgery involves several techniques to widen the airways and improve breathing. The specific surgical procedures depend on the individual dog's condition, but commonly includes;

1. **Sacculectomy:** excision of everted laryngeal saccules to open the airway
2. **Tonsillectomy:** removal of enlarged tonsils to clear the airway
3. **Staphylectomy/plastoplasty:** to prevent airway obstruction the longated softpalate should be shortened and thinned.

4. **Alarplasty:** the stenotic nares are widened to improve the airflow through the nostrils.

Most common queries about BOAS

1. Is BOAS curable?

Surgery can greatly relieve symptoms and improves the well being, BOAS remain as a severe condition that required continuous monitoring and supportive care for the sound management.

2. Is BOAS painful for dog?

This is usually not painful, but it may cause some sort of distress and discomfort if it is left ummanaged. And sometimes even cause complicated life-threatening problems.

Ethical consideration

The prevalence of BOAS raises significant ethical concerns regarding the breeding of brachycephalic dogs. Veterinary professionals and animal welfare organizations advocate for breeding programs focused on the health and welfare animals over physical appearance. Public awareness campaigns and educational initiatives are essential to inform potential pet owners about the risks associated with brachycephalic breeds, promoting informed decision-making when selecting a pet.

Conclusion

Brachycephalics obstruction airway syndrome represents a significant welfare concern for brachycephalic dog breeds due to the anatomical deformities associated with selective breeding for flat-faced appearances. While affected dogs may show outward signs of affection and vitality, they often suffer silently from chronic respiratory distress, sleep disorders, heat intolerance and reduced exercise capacity. Early diagnosis, responsible breeding practices and appropriate surgical or medical interventions are critical to improving the overall welfare and health status of these animals. Ultimately, greater awareness among breeders, veterinarians and pet owners is essential to reduce the prevalence of BOAS and prioritize the health and wellbeing of future generations of companion animals.