



SPECIAL CONSIDERATIONS FOR BRAKYCEPHALIC PATIENTS

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Introduction

Brachycephalic breeds are becoming increasingly popular, but we must be aware that despite their popularity, they are breeds that present many medical problems due to the configuration of the head (airway problems, eyes, teeth) or the digestive system in general (regurgitation, vomiting, ulcers, hiatal hernias, etc.).

Nowadays, it is common to see these breeds at the clinic for a multitude of problems:

- Eye surgery: corneal ulcers, eyelid correction, enucleation
- Airway surgery: correction of BOAS syndrome
- Neurology: MRIs (hemivertebrae, syringomyelia, hydrocephalus), spinal surgery
- Orthopaedics: fractures
- Soft tissue surgery: hiatal hernia, pulmonary torsion
- Medicine: pneumonia, digestive problems
- Dermatology: skin fold corrections, pyoderma, atopy
- Emergencies: airway obstruction, heatstroke

Due to their significant presence in daily clinical practice, it is necessary to familiarise oneself with the possible complications (and how to treat them) when these breeds require anaesthesia.

Anaesthetic risk

Anaesthetic mortality currently stands at 0.69% worldwide (1). Speaking with the authors of the latest mortality study, there is a difference in mortality between brachycephalic breeds and other breeds (0.91% vs 0.75%) (1, personal communication).

If we analyse the issue in greater depth, we can see that the rate of complications in the intraoperative period is similar in brachycephalic and other breeds (49.8% vs 48.4%), while there is a large difference in the postoperative period (13.9 vs 3.6%) (2).

The most common complications cited in the literature are aspiration pneumonia, regurgitation, dysphoria, prolonged recovery, rales, and death (2).

However, it has been shown that patients who undergo corrective airway surgery are 79% less likely to experience complications in the postoperative period when anaesthetised for other procedures after correction (3).

Anaesthetic considerations

Airway obstruction

These breeds are more susceptible due to their anatomical configuration and constant airway irritation (panting, barking, everted sacs, etc.). The risk is greater when the patient is sedated or unconscious and the airway is not secured. The consequences of obstruction are hypoxemia, hyperthermia, vagal reflex, and pulmonary edema due to negative pressure.



Gastrointestinal system disorders

There is a high prevalence of gastrointestinal problems in these breeds when they present symptoms of BOAS. These problems are observed in clinical presentation, endoscopic tests and at the histological level. Studies show an improvement in clinical signs after surgical resolution of BOAS, especially in French Bulldogs. In one study, 84% of brachycephalic dogs regurgitated under general anaesthesia, while the reflux rate is practically the same in brachycephalic and non-brachycephalic dogs.

Corneal ulcers and decreased tear production

In general, these breeds are more likely to develop corneal ulcers because their eyes are more prominent, they have less corneal sensitivity and are predisposed to dry eyes. When anaesthetised, the risk increases due to the absence of blinking, decreased tear production (caused by anaesthetics) and the unnoticed risk of corneal trauma (changes in position on the table). A study showed that lubricating the cornea every 2 hours is not sufficient in these breeds to prevent corneal erosion.

Prevalence of heart disease

English and French Bulldogs and Boxers have a high incidence of congenital heart disease. Chronic hypoxia can eventually lead to pulmonary hypertension and right heart failure. It also causes increased vagal tone, predisposing these breeds to bradycardia, sinus arrest, syncope and atrioventricular block.

Other

In human patients with sleep apnoea, hypercoagulability, hypertension and hypomagnesaemia are often diagnosed concurrently.

Anaesthetic management

Admission

The medical history should be assessed and a thorough physical examination performed.

At our hospital, we have developed scales so that all staff can understand and examine the patient's presentation (severity of BOAS and what to do in case of deterioration).

It is recommended to take a blood sample to establish baseline values. This analysis may be minimal or more extensive depending on how long the patient has been without haematology and blood chemistry results.

If the patient has a history of vomiting and/or regurgitation, the need for treatment prior to anaesthesia should be assessed (proton pump inhibitors, gastroprotective agents, prokinetics and/or anti-nausea medication).

Premedication

The use of sedation minimises anxiety and stress, and can therefore help improve airway flow. It can also help us provide preoxygenation and establish a venous line and monitoring before anaesthetic induction.

It is recommended to prepare everything necessary for patient induction even before attempting to catheterise the patient.



Induction

Any intravenous anaesthetic that produces a smooth and rapid induction may be suitable for induction.

Intubation

Any aids that allow for better visualisation of the larynx and facilitate the insertion of the endotracheal tube (bright light, stylet, tracheostomy tubes) should be kept handy.

It is recommended to have a suction machine on hand in case regurgitation occurs during this period.

Maintenance

TIVA, PIVA or inhalation anaesthesia may be used, although inhalation or PIVA is preferred to avoid very long recoveries and excessive muscle relaxation.

When positioning on the table, the inverted Trendelenburg position should be avoided as much as possible. Due to increased vagal tone, it is recommended to change the decubitus position (sternal to dorsal or vice versa) in two steps.

Care should be taken with analgesia, as unnecessary stimulation may increase the risk of regurgitation.

Recovery

This phase is the most complicated for this type of patient, as we must avoid airway obstruction at all costs.

It is recommended to place the patient in the sternal decubitus position. The airway and oesophagus should be suctioned to ensure that there are no debris (clots, saliva, phlegm, gastric contents, etc.).

If acepromazine has not been used in premedication and there are no contraindications, its administration should be considered to prevent delirium during recovery and keep the patient stress-free.

Delayed extubation helps protect the airway for longer (from foreign bodies) and improves muscle tone (helps prevent airway collapse due to lack of muscle tone).

Once extubated, the head should be kept elevated, the neck extended, and the tongue retracted rostral. Today, there are dental blocks or the AirCan that help maintain an airway after extubation in these patients.

It is imperative to maintain constant visual monitoring in these patients and to have a reintubation kit accessible in case of suspected obstruction.

Finally, panting and hyperthermia should be avoided during recovery.

Management of possible complications

To treat regurgitation, it is recommended to aspirate the contents and administer a 4.2% bicarbonate solution (8.4% bicarbonate diluted with water to 50%). Esophageal lavage with water alone often fails to raise the pH and prevent damage to the mucosa, while increasing the risk of aspiration. Diluted bicarbonate alone can raise the pH of the oesophageal contents to acceptable levels.

Avoid administering NSAIDs until the patient has fully recovered and is free of obstruction if dexamethasone must be administered urgently to control airway inflammation.

Discuss the use of antacids and drugs to control nausea and vomiting in the postoperative period.

If the patient presents with rales or partial airway obstruction, nebulised adrenaline in saline may be used once extubated. Similarly, if mucosal congestion is suspected, a vasoconstrictor may be administered through the nostrils.

The use of vasoconstrictors may also help control bleeding, although it should be noted that they may have a rebound effect. If bleeding is present before extubation, it is more advisable to maintain anaesthesia, use ice packs to accelerate coagulation, and extubate when there is an organised clot.



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