

OPTIONS FOR ANESTHESIA AIRWAY CONTROL IN CATS

If a patient is at a surgical depth of anesthesia they are not able to protect their airway. Unconscious patients do not have adequate laryngeal reflexes to prevent aspiration or adequate pharyngeal muscle tone to prevent airway obstruction. Anesthetized patients are at risk of airway obstruction, hypoxemia, hypoventilation, and aspiration. Thus, for safety reasons, we should take measures to protect our patients' airways during anesthesia.

Controlling the airway of anesthetized patients is important to

- Prevent aspiration of water, gastric contents, debris, etc during anesthesia
- Prevent airway obstruction
- Prevent hypoxemia
- Allow provision of supplemental oxygen
- Facilitate delivery of inhaled anesthetic medications
- Allow manual or mechanical ventilation
- Minimize trauma to airway
- Prevent environmental and staff exposure to waste anesthetic gases

Three options for controlling the airway in cats will be discussed and compared. The author does not consider Fask Masks as a means of controlling the airway. Face masks do allow delivery of supplemental oxygen and inhaled anesthetics, however, they do not prevent airway obstruction or aspiration or allow manual/mechanical ventilation.

1. Endotracheal tubes (ETTs)

- i. Clear, cuffed PVC ETTs with Murphy Eyes and Valve on pilot balloon recommended
 - i. Can visually inspect for presence of mucus, blood or debris
 - ii. High-volume low-pressure cuffs distribute pressure more evenly on tracheal mucosa, less likely to cause ischemia if properly inflated
- ii. Silicone cuffed ETTs with Murphy Eyes
 - i. Silicone tubes are soft, may become kinked or fragmented and often require a stylet for placement
 - ii. Low-volume high-pressure cuffs focus cuff pressure on a smaller surface area and more likely to cause damage to tracheal mucosa
- iii. Red rubber ETTs no longer recommended
 - i. Unable to inspect visually for debris, mucus or blood
 - ii. Lack valves on pilot balloons
 - iii. Rubber adheres to cleaning solutions and, thus, make irritate trachea
- iv. Advantages of Endotracheal Intubation
 - i. Cuff inflates to create seal with trachea to prevent aspiration
 - ii. Team members familiar with equipment because commonly used
 - iii. Inexpensive, reusable, can be sterilized

- iv. Doesn't take up much room in mouth (ie, allows dental exam, radiographs, dental procedure)
- v. Routine use of laryngoscope decreases laryngeal trauma, decreases time required to secure airway, allows examination of oral cavity and develops skills for emergency intubation
- v. Disadvantages of Endotracheal Intubation
 - i. Requires advanced training, knowledge and skill
 - ii. Much of the ETT enters the trachea and can traumatize the tracheal mucosa
 - iii. Cuff can be over-inflated to cause damage/rupture to the trachea
 - iv. Tip of ETT is relatively rigid and can traumatize larynx and trachea
 - v. May contribute to excessive equipment dead space
 - vi. May lead to endo-bronchial intubation if do not measure length to thoracic inlet
 - vii. May cause tracheal trauma if ETT not disconnected from breathing circuit during position changes

2. Supraglottic Airway Device (V-gel[®])

- i. Silicone device specifically molded and sized to fit over the larynx in cats
 - i. Manufactured by Docsinnovent, docsinnovent.com
 - ii. Rabbit-specific Supraglottic device (V-gel[®]) also available
- ii. Advantages of Supraglottic Airway
 - i. Anatomically molded to seal around the larynx and esophagus of the feline airway to prevent aspiration
 - ii. Multiple sizes available
 - iii. Minimal dead space with built-in adapter for side-stream capnography
 - iv. Does not enter the trachea, thus minimal risk of tracheal trauma
 - v. Easy to place
 - vi. Reusable, can be sterilized
 - vii. May facilitate ventilation to low inspiratory pressures
 - viii. Does not require the use of a laryngoscope
- iii. Disadvantages of Supraglottic Airway
 - i. Bulky device limits ability to take oral radiographs or perform oral surgery
 - ii. Can cause obstructive breathing pattern if not sized appropriately or if becomes dislodged
 - iii. End-tidal CO₂ (capnography) required to alert team to airway obstruction
 - iv. Expensive
 - v. Does not require the use of a laryngoscope or an oral exam
- iv. Ideal setting for use of the Supraglottic Airway
 - i. Non-dentistry feline practice
 - ii. High volume practice
 - iii. Rabbit anesthesia using rabbit-specific V-gel[®]

3. Laryngeal Mask Airway (LMA)

- i. A supraglottic airway device with an inflatable rim designed for humans that has been used with limited success in cats (neonatal size LMA). Now that a species-specific Supraglottic airway device (V-gel[®]) is available for cats and rabbits use of neonatal LMAs are no longer recommended.

Resources:

- Endotracheal tubes: Clear, cuffed PVC ET tubes with Murphy eyes for sizes 2.5 thru size 10. Example: AirCare Tubes by Smiths-Medical. Available through veterinary distributors. Cuffed silicone tubes with Murphy eyes for sizes 11, 12, and 14. Manufacturer: Surgivet or Jorvet.
- V-Gel® Supraglottic Airway Device: Six (6) sizes of Cat V-gels available to achieve airway seal in cats of different weights and anatomic variations (short vs long nose). Web-based training available from company. Docsinnovent.com Distributed by Jorvet.
- Brodbelt DC, Pfeiffer DU, Young LE & Wood LN. Risk factors for anaesthetic-related death in cats: results from the confidential enquiry into perioperative small animal fatalities (CEPSAF). *Br J Anaesth* 2007; 99: 617–23
- Trinity Trach Tube Ties – orange ties that have a strong grip on a variety of airway devices. Trachtubeties.com