

Rethinking Airway Protection in Canine Anaesthesia: The potential role of the Dog v-gel® Advanced in Canine Anaesthesia

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Disclaimer: Docsinnovent Ltd are the manufacturer of v-gel® Supraglottic airway devices.

Abstract

Endotracheal intubation historically and habitually remains the standard method of airway management during general anaesthesia in dogs as there has been no real viable alternatives.

But, although canine intubation is generally straightforward compared with other veterinary species, this perceived ease of tube placement should not be equated with complete protection against airway complications, nor should the inflation of a cuff assume to provide absolute protection against pulmonary aspiration. With a new device, the dog v-gel® Advanced its similar ease and speed of placement with no requirement of inflation to create a gas, or fluid seal offers up a challenge.

This article reviews the benefits and limitations of both conventional cuffed ETTs and the v-gel® Advanced with regards to the airway protection and clinical use leaving the clinician to decide.

Reconsidering canine airway management

Endotracheal intubation has long been regarded as the gold standard for airway management in canine anaesthesia. It has for years provided a secure airway allowing controlled ventilation and arguably protects against aspiration. Dogs are generally considered easy to intubate, and direct laryngoscopy usually allows rapid placement of a cuffed ETT. For many clinicians, it is a familiar and relatively straightforward technique. However, “gold standard” does not necessarily mean it is the best option for every patient or every procedure, and it should not be the sole determinant of airway choice.

The more relevant clinical question is not whether a dog **can** be intubated, but **which** airway strategy offers the most appropriate balance between effective ventilation, airway protection, management of gastro-oesophageal reflux and minimisation of airway trauma for the individual patient and procedure.

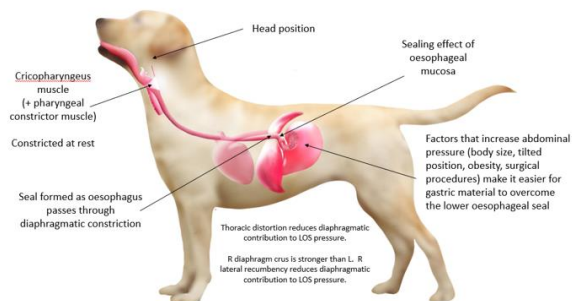
Although cuffed ETTs potentially provide a secure gas airway and remain indispensable in many clinical situations, they **do not** eliminate the risk of reflux or aspiration and inevitably expose the trachea to cuff-related pressure. A modern approach to canine airway management should therefore move beyond routine tracheal intubation and be regarded as a clinical decision based on risk-benefit assessment rather than ease of placement alone.

Tracheal injury associated with cuff pressure

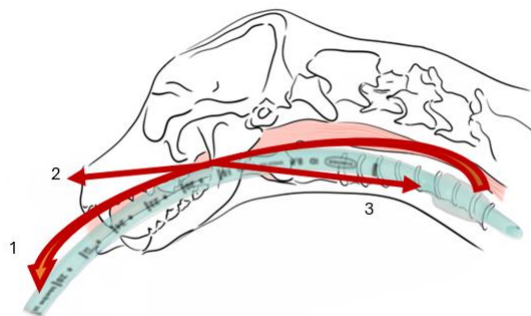
Cuffed ETTs achieve their seal by exerting circumferential pressure on the tracheal wall. While appropriate cuff inflation is essential to minimise gas leakage, excessive pressure may impair mucosal blood flow and contribute to irritation, oedema, ischaemia and, in severe cases, ulceration or tissue necrosis.

Studies in dogs have demonstrated the relationship between cuff pressure and tracheal mucosal perfusion, also highlighting the variability of subjective cuff inflation techniques and the frequency of inappropriate cuff pressures in clinical practice.

This presents a familiar clinical dilemma: a cuff that appears to leak often prompts additional inflation, yet without objective cuff-pressure monitoring, further inflation may expose the trachea to unnecessarily high compressive forces. Consequently, even in dogs that are easy to intubate, it does not mean that the trachea is biologically indifferent to the presence of the tube and cuff.



Anatomical considerations that impact reflux & regurgitation



Free pathways of reflux & regurgitant from oesophagus during intubation (exiting 1. mouth , 2. nasal chambers or 3. back down larynx)

Gastro-oesophageal reflux: an important peri-anaesthetic complication

General anaesthesia alters normal protective physiology and predisposes dogs to gastro-oesophageal reflux. Reduced lower oesophageal sphincter tone, anaesthetic drugs, patient positioning, abdominal pressure and surgical factors may all contribute. Importantly, reflux is frequently clinically silent and may occur without visible regurgitation.

Consequences range from oesophageal exposure to acidic or biliary contents and oesophagitis to dysphagia, oesophageal stricture formation and, in severe cases, pulmonary aspiration. Refluxed material may contaminate the pharynx and laryngeal region before aspiration occurs.

Because reflux often develops without obvious clinical signs, airway management should extend beyond maintenance of ventilation to include, where possible, early recognition and management of gastrointestinal contamination before it progresses to respiratory compromise.

The limitations of cuffed endotracheal tubes

Cuffed ETTs are frequently described as providing a “protected airway”, but this should not be interpreted as complete protection against aspiration.

Several mechanisms may reduce the effectiveness of the cuff seal:

- Longitudinal folds within high-volume, low-pressure cuffs may create microchannels that permit fluid leakage.
- Inadequate cuff inflation may allow leakage of gas and contaminated fluid.
- Increasing cuff pressure to improve the seal may expose the tracheal mucosa to excessive compression.
- Changes in head position, airway pressure and patient movement during anaesthesia may alter cuff performance.
- Regurgitated material may still accumulate within the pharynx around the larynx and external surface of the tube, even when distal leakage is limited.
- Distal inflation in trachea leaves the upper airway open to fluid collection

Accordingly, ETTs should be regarded as highly effective airway devices that substantially reduce aspiration risk under some circumstances, but not as infallible anti-aspiration barriers.



Benchtop study showing fluid travelling passed ETT cuff involutions

The dog v-gel® Advanced: A Different Airway Strategy

The dog v-gel® Advanced is based on a fundamentally different principle from the conventional cuffed ETT. It is a third-generation supraglottic airway device designed specifically for canine anatomy. Rather than passing through the larynx into the trachea, it re-lines the pharynx forming a seal around the laryngeal inlet. By remaining outside the trachea, the device avoids the need for an inflatable cuff and the circumferential pressure that accompanies conventional tracheal intubation; decreasing irritation, coughing during recovery, and postoperative discomfort. This can be particularly beneficial in patients with delicate airways or where repeated airway instrumentation may increase the risk of tissue injury.

One of the greatest advantages of the dog v-gel® Advanced is its ease and speed of placement avoiding the time required to safely inflate any cuff. Successful insertion generally requires less technical expertise than direct laryngoscopy and intubation, making airway management more consistent across operators with varying levels of experience. By reducing the time spent securing the airway and minimise interruptions during anaesthetic induction, workflow is increased. Placement often requires fewer instruments, less manipulation of the patient's head and neck, and may reduce the need for optimal laryngeal visualisation. This can be advantageous in patients with challenging anatomy or limited mouth opening.

Potential advantages of this approach include:

- avoidance of direct tracheal cuff contact
- elimination of cuff overinflation as a cause of tracheal injury
- reduced dependence on subjective cuff inflation techniques
- less instrumentation of the laryngo-tracheal axis.



These features may be particularly relevant in patients undergoing repeated anaesthesia or where minimising tracheal instrumentation is desirable. However, as with any airway device, selection should remain guided by patient, procedural and ventilatory requirements rather than by a single design characteristic. the best option for every patient or every procedure.

From Passive Airway Protection to Active Management...Beyond Ventilation Alone

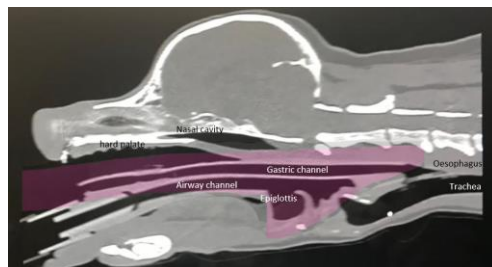
Conventional airway management has traditionally focused on preventing aspiration by creating a seal within the distal trachea, but this still leaves the proximal airway open. However, while this remains an important objective a cuffed ETT does not address the source of contamination or provide a means of managing gastric contents once reflux has occurred.

The defining feature of the dog v-gel® Advanced is its integrated gastric channel, which is designed solely to secure the airway. The gastric channel provides a dedicated route for oesophageal or gastric access, facilitating recognition and management of refluxed or regurgitated material.

This reflects an important conceptual distinction. Gastro-oesophageal reflux is initially a gastrointestinal event; aspiration occurs only if gastric contents subsequently enter the respiratory tract. A device that enables management of gastrointestinal contents before pulmonary contamination develops may therefore offer advantages beyond ventilation alone.

Where clinically appropriate, the gastric channel may facilitate:

- gastric decompression
- evacuation of gas or fluid
- suction of refluxed material
- improved recognition of reflux events
- access to the stomach or oesophagus during anaesthesia.



MRI showing separate airway and gastric channels of the Dog v-gel® Advanced



Characteristic	Cuffed ETT	Generic supraglottic airway	Dog v-gel® Advanced
Position	Intratracheal	Supraglottic	Species-specific supraglottic
Passes vocal cords	Yes	No	No
Inflatable tracheal cuff	Usually yes	Device dependant	No
Risk of cuff-pressure tracheal injury	Present	Absent	Absent
Direct tracheal instrumentation	Yes	No	No
Designed specifically for canine anatomy	No	No	Yes
Dedicated gastric channel	No	Device-dependent	Yes
Gastric tube access	Separate procedure	Device-dependent	Integrated pathway
Potential reflux detection	Limited	Device-dependent	Yes
Potential gastric decompression	Separate tube required	Device-dependent	Yes. Facilitated through channel
High airway-pressure capability	Yes	Variable	Limited
Evidence base	Extensive	Variable	Developing

The potential clinical value of this feature lies not in preventing reflux itself, but in providing an opportunity to identify and manage reflux before it progresses to aspiration.

So rather than relying solely on a distal tracheal seal, this approach supports a more proactive strategy by encouraging clinicians to ask:

Has reflux occurred?

Can refluxed material be recognised and identified promptly?

Can gastric contents be diverted, drained or suctioned before aspiration develops?

The design philosophy of the dog v-gel® Advanced broadens this approach by combining a supraglottic airway with a dedicated gastric drainage pathway. This functionally separates the respiratory and gastrointestinal tracts, directing ventilation towards the laryngeal inlet while providing independent access to the alimentary tract. This represents a shift from passive protection towards active management of peri-anaesthetic gastrointestinal contamination.

Ultimately, the value of the dog v-gel® Advanced should be assessed within the broader context of peri-anaesthetic airway management rather than solely as an alternative to the cuffed ETT. Its greatest potential contribution may be encouraging clinicians to adopt a more comprehensive approach to airway safety that considers ventilation, reflux, aspiration risk and tracheal health together rather than as separate clinical issues.



Clinical Applications

Canine anaesthesia has traditionally approached airway security from a trachea-centred perspective; however both devices have important roles in veterinary anaesthesia, but they are not interchangeable in every situation.

The dog v-gel® Advanced is often preferred when rapid, low-trauma airway placement is desirable and when the procedure does not require high pressure ventilation. It is especially useful for routine anaesthesia, short to moderate procedures, and patients in whom laryngoscopy or tracheal intubation may be difficult or unnecessarily invasive.

Endotracheal intubation remains the better choice when the airway is compromised (partial or complete laryngeal paralysis, collapsed trachea) or when the procedure requires access to pharynx, or upper airway. It is also preferred when prolonged or high-pressure ventilation is anticipated.

These considerations should not be interpreted as evidence that either device is universally preferable as airway management should remain individualised, taking into account the patient's anatomy, respiratory requirements, surgical procedure and anticipated airway pressures. However, it does mean that the assumption "dogs are easier to intubate" deserves reconsideration.

Potential Roles During Cardiopulmonary Resuscitation

Airway management during cardiopulmonary resuscitation (CPR) presents different priorities from those encountered during elective anaesthesia. Rapid establishment of ventilation, uninterrupted chest compressions and minimisation of procedural delay are key objectives.

In appropriately trained hands, a species-specific supraglottic airway may offer practical advantages by avoiding direct tracheal intubation while providing effective gentle oxygenation and ventilation. And the integrated gastric channel may also facilitate management of gastric insufflation or regurgitated material, both recognised challenges during positive-pressure ventilation.

However, the dog v-gel® is currently advocated for use with spontaneously breathing patients and evidence supporting its use during canine CPR does remain limited. Further studies are required to evaluate device performance during active chest compressions, prolonged ventilation, higher airway pressures and clinically relevant regurgitation events (with appropriately sized devices) before conclusions regarding comparative effectiveness can be drawn.

Situations for clinical use of different airway devices (this is not an exhaustive list)

	ETT	Dog v-gel® Advanced
Routine general anaesthesia is planned	✓	✓
The patient has a potentially difficult laryngoscopy or intubation		✓
increased risk of fluid aspiration, gastro-oesophageal reflux or regurgitation		✓
repeated anaesthetic procedures		✓
concern regarding tracheal mucosal injury or tracheal mucosal vulnerability		✓
procedures in which gastric decompression may be advantageous		✓
Passing of a bronchoscope (directly airway channel)		✓
Surgical procedure requires access to pharynx, upper airway, trachea	✓	
Upper airway anatomy is compromised - a partial or fully paralysed larynx - a collapsed trachea - A neuromuscular block is incorporated into induction	✓	
High pressure ventilation is required	✓	
Passing of a gastroscope	✓	



Conclusion

Endotracheal intubation remains an essential component of canine anaesthesia and is likely to remain the preferred airway technique whenever high airway pressures, prolonged controlled ventilation or specific procedural requirements demand a secure intratracheal seal. However, ease of tracheal intubation **should not** be interpreted as evidence that routine cuffed endotracheal intubation is always the optimal airway strategy, nor should an inflated cuff be regarded as providing complete protection against regurgitation or pulmonary aspiration.

Peri-anaesthetic gastro-oesophageal reflux remains an important source of morbidity in dogs, while cuff-related tracheal injury represents a separate but often underappreciated consequence of conventional airway management. These considerations highlight the need to evaluate airway devices not only by their ability to facilitate ventilation, but also by their impact on the broader respiratory and gastrointestinal risk pathway.

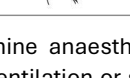
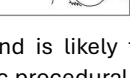
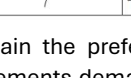
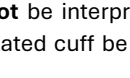
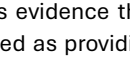
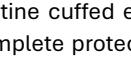
The dog v-gel® Advanced represents a different airway management strategy. By combining a species-specific supraglottic airway with an integrated gastric channel, it offers a design intended to support ventilation while facilitating recognition and management of refluxed gastric contents without routine placement of an inflatable cuff within the trachea.

At present, the available evidence supports neither universal replacement of cuffed ETTs nor dismissal of the dog v-gel® Advanced. Rather than viewing the dog v-gel® Advanced and cuffed endotracheal tubes as competing technologies, they should be regarded as complementary devices with different strengths, limitations and clinical indications. Appropriate airway selection should be guided by the individual patient's anatomy, the planned procedure, anticipated ventilatory requirements and the relative risks of reflux, aspiration and tracheal injury. The greatest contribution may be to encourage a broader approach to airway management - one that considers protection of both the respiratory and gastrointestinal systems, rather than focusing solely on placement of a tube within the trachea.

Further Reading

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This table is intended to be a guide only. The right size v-gel® advanced will be determined by the size and shape of a dog's pharynx, which varies depending on the breed, size and head and neck shape of the dog.

Head shape – Brachycephalic	Lean weight of dog	Head shape – Mesocephalic	Lean weight of dog	Head shape – Dolichocephalic	Lean weight of dog	Size/ Product code
	6 – 10kg 13 – 22lb		4 – 7kg 9 – 15lb		2 – 4kg 4.5 – 9lb	D3 = D20003
	9 – 15kg 20 – 33lb		6 – 10kg 13 – 22lb		4 – 7kg 9 – 15lb	D4 = D20004
	14 – 20kg 30 – 45lb		9 – 15kg 20 – 33lb		6 – 10kg 13 – 22lb	D5 = D20005
	19 – 26kg 42 – 57lb		14 – 20kg 30 – 45lb		9 – 15kg 20 – 33lb	D6 = D20006