



# BestBETS for Vets

Supporting veterinary clinicians in making evidence-based decisions



## In rabbits does an endotracheal tube or v-gel result in better controlled ventilation?

### Clinical Scenario

You are a veterinary surgeon preparing to anaesthetise a healthy pet rabbit for a routine midline spay. In your practice you have the choice of using an endotracheal (ET) tube, with an array of different sizes available, or three different sizes of v-gel® (small, medium or large) for securing the rabbit's airway. You sometimes struggle to place an ET tube in rabbits because you do not regularly perform surgery in this species. Your colleague tells you that v-gels® are easy to place and can enable controlled ventilation but you have heard stories that they can move out of place and occlude the airway mid-procedure. If intermittent positive pressure ventilation was necessary during the surgery in an emergency situation, you wonder whether using an ET tube would result in better controlled ventilation than using v-gels® in rabbits.....

### 3-Part Question (PICO)

In [rabbits undergoing general anaesthesia], does using a [v-gel airway device versus an endotracheal tube] result in [better airway management under the conditions of controlled ventilation]?

### Search Strategy

#### MEDLINE(R) In-Process & Other Non-Indexed Citations and MEDLINE(R) 1946 to Present using the OVID interface

(rabbit.mp. OR rabbits.mp. OR cuniculus.mp. OR lapine.mp. OR Oryctolagus.mp. OR exp rabbits/ OR exp Cuniculidae/ OR exp Lagomorpha/)

**AND**

(anaesthesia.mp. OR anesthesia.mp. OR anaesthetic.mp. OR anesthetic.mp. OR exp Anesthesia, General/ OR exp Anesthesia/ OR exp Anesthetics, Inhalation/)

**AND**

(supraglottic.mp. OR supraglottic airway devices.mp. OR SAD.mp. OR SGAD.mp. OR v-gel.mp. OR exp Glottis/ OR exp Respiration, Artificial/ OR exp Laryngeal Masks/)

**AND**

(endotracheal tube.mp. OR tracheal.mp. OR ET.mp. OR intratracheal tube.mp. OR exp Intubation, Intratracheal/ OR exp Airway Management/ OR exp Trachea/)

## CAB Abstracts 1910 to Present using the OVID interface

(rabbit.mp. OR rabbits.mp. OR cuniculus.mp. OR lapine.mp. OR Oryctolagus.mp. OR exp rabbits/ OR exp Cuniculus/ OR exp Oryctolagus/ OR exp Oryctolagus cuniculus/)

### AND

(anaesthesia.mp. OR anesthesia.mp. OR anaesthetic.mp. OR anesthetic.mp. OR exp inhaled anaesthetics/ OR exp anaesthetics/ OR exp anaesthesia/)

### AND

(supraglottic.mp. OR supraglottic airway devices.mp. OR SAD.mp. OR SGAD.mp. OR v-gel.mp. OR endotracheal tube.mp. OR tracheal.mp. OR ET.mp. OR intratracheal tube.mp. OR exp ventilation/)

## Search Outcome

### MEDLINE

- 127 papers found in MEDLINE search
- 124 papers excluded as they don't meet the PICO question
- 0 papers excluded as they are in a non-English language
- 1 papers excluded as they are review articles/in vitro research/conference proceedings
- 2 total relevant papers from MEDLINE

### CAB Abstracts

- 113 papers found in CAB search
- 108 papers excluded as they don't meet the PICO question
- 0 papers excluded as they are in a non-English language
- 5 papers excluded as they are review articles/in vitro research/conference proceedings
- 0 total relevant papers from CAB

### Total relevant papers

2 relevant papers from both MEDLINE and CAB Abstracts

## Summary of Evidence

### Toman et al. 2015, Turkey

**Title:** Comparison of the effects of various airway devices on hemodynamic response and QTc interval in rabbits under general anesthesia.

Twenty-four adult white New Zealand rabbits, weighing 2.5-3kg in size, housed in a research centre.

**Patient group:** Animals were allocated to 4 different groups: Endotracheal group (ET), Cobra Perilaryngeal airway device, laryngeal mask and v-gel device.

The main aim of the study was not the same as the aim of this BET.

**Study Type:** Randomised controlled trial.

- Mean arterial blood pressure (MAP).
- ECG measurements: QT duration and QTc (adjusted QT).

**Outcomes:**

- Heart rate (HR) measured at baseline, 1st, 5th, 15th and 30th minute after placement of airway device.
- Blood gas values.

**Key Results:**

- No statistically significant difference between the ET and v-gel groups in relation to blood gas values at baseline, 10<sup>th</sup> minute or 30<sup>th</sup> minute intervals. It isn't clear from the methods how often blood gas analysis was carried out so there is uncertainty whether these three intervals represent all measurements that were taken for this parameter.

**Study Weaknesses:**

- Small sample size was used without justification (e.g. sample size calculation).
- Did not state how the randomisation was carried out.
- No methods provided for how blood gas assessments were carried out.
- Blood gas results were not detailed. Only aggregated results are provided, given that there were only 6 animals in each group, further detail on each animal would have been good to see.
- No mention of blood gas results in the discussion or conclusion.
- The study focuses heavily on parameters that are not necessarily the best measures of ventilation.

**Attachment:**



Evidence appraisal (/soe\_attachments/586/4187-Toman et al. 2015\_27.09.23\_Final.pdf)

## Uzun et al. 2015, Turkey

**Title:** The investigation of airway management capacity of v-gel and cobra-PLA in anaesthetized rabbits.

**Patient group:** 44 male adult New Zealand white rabbits (24 animals in experiment 2; n=6 allocated to each of the 4 groups compared). All rabbits were aged between 6-8 months and weighed between 2 and 3.5 kg.

**Patient group:** Assume experimental animals as owners not mentioned.

The main aim of the study was not the same as the aim of this BET.

**Study Type:** It is possible that this is a controlled trial (not a randomised controlled trial), however, the randomised controlled trial critical appraisal sheet has been used to assess the study as it is the one that most closely aligns to the work.

**Outcomes:**

- PaCO<sub>2</sub>
- PaO<sub>2</sub>
- Arterial pH
- ETCO<sub>2</sub>
- Insertion time of device (length of time it took to place the device).
- Number of attempts to place the device.
- Signs of cyanosis, airway bleeding and oedema.

**Key Results:**

- Only experiment 2 (24 animals; n=6 in each of the 4 comparison groups) contained information answering our PICO question (ET versus v-gel).
- Two of the four graphs in Figure 2 were missing so the results were not available for these two outcomes of interest (arterial pH and arterial PaCO<sub>2</sub>). It states in the text there are statistically significant differences between groups (but not sure if this applies to our two interest groups) for arterial pH and PaCO<sub>2</sub>, stating that the v-gel CV group showed significantly high PaCO<sub>2</sub> levels at 1st, 5th, and 30th min (p<0.05).
- The ET CV group demonstrated a lower ETCO<sub>2</sub> than the v-gel CV group across all time points, but this was not statistically significant.
- The text states that there is a statistically significant difference in PaO<sub>2</sub> at 15 mins for one of the CV groups, but it isn't clear which group this refers to.

**Study Weaknesses:**

- Small sample size was used without justification (e.g. sample size calculation).
- No description of how animals were allocated to groups or if this was done randomly. It is possible this study is a controlled trial and not a randomised controlled trial but without more detailed description, it is difficult to determine whether random allocation should have been carried out.
- There was some missing data and the text referred to two absent graphs for the controlled ventilation experiment (within Figure 2, Graph A showing arterial pH, and Graph B showing arterial PaCO<sub>2</sub> are both missing).
- Considering there were only 6 rabbits in each group in experiment 2, further detail about the measurements for each animal would have been beneficial.
- One rabbit in the ET group did not complete the study 'healthy'

**Attachment:**

Evidence appraisal (/soe\_attachments/586/4205-Uzun et al. 2015\_27.09.23\_Final.pdf)

## Comments

Both studies were conducted at the same university with the same number and breed of rabbit involved (24 animals in Toman et al. and 24 animals in experiment 2 in Uzun et al.); the papers based on this work were also published within the same year. Although there are 2 different ethical approval numbers mentioned, it is possible that the animals reported in both studies are the same ones.

Both studies are likely to be significantly underpowered because of the small numbers of animals involved and without justification of the sample sizes used, potentially could explain the lack of statistically significant difference between the groups.

Both studies only use one breed of rabbit that is not representative of the common pet rabbit breeds seen in clinical practice, which are often brachycephalic and so have different upper respiratory tract conformations.

The main aim of both studies was not the main aim of this BestBET.

## Bottom line

**Based on the evidence available at the present time, it is difficult to conclude that use of either a v-gel device or an endotracheal tube results in better airway management under controlled**

## ventilation conditions in rabbits undergoing general anaesthesia.

### Disclaimer

The BETs on this website are a summary of the evidence found on a topic and are not clinical guidelines. It is the responsibility of the individual veterinary surgeon to ensure appropriate decisions are made based on the specific circumstances of patients under their care, taking into account other factors such as local licensing regulations. **Read small print (/disclaimer)**

## References

Toman H, Erbas M, Sahin H, Kiraz HA, Uzun M, Ovali MA, (2015). Comparison of the effects of various airway devices on hemodynamic response and QTc interval in rabbits under general anesthesia. *Journal of Clinical Monitoring and Computing*, **29**: 727–732, <https://doi.org/10.1007/s10877-015-9659-x>.

Uzun M, Kiraz HA, Ovali MA, Sahin H, Erbas M, Toman, H, (2015). The investigation of airway management capacity of V-Gel and cobra-pla in anaesthetised rabbits. *Acta Cirurgica Brasileira*, **30**: 80-86, <http://dx.doi.org/10.1590/S0102-86502015001000011>.

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