Tips and Tricks for a Smooth GA

(How to minimise your stress around an anaesthetic – are you ready for it?)

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13 Quick Tips

1) Catheter placement
2) Pre-oxygenation
3) Induction
4) Spraying lidocaine
5) ETT size
6) Intubation
7) Tie-ing up
8) Inflating the cuff
9) Monitoring ready to go
10) Temperature
11) Rolling animals
12) Recovery
13) Analgesia

1) Catheter Placement – are you ready for it

- Clip
- Prep
- Catheter
- Tape
- Comfort swab
- T-port/bung
- Tegaderm

Catheters

- Size?
- How to tape?
- Bandage?

$$R = \frac{8\eta l}{\pi r^4}$$

$$Q = \frac{\pi(P_1 - P_2)r^4}{8\eta L}$$

Flow (litres per second)

Pi

Pressure gradient

Radius

Viscosity

Length

2) Pre-oxygenating

- Flow-by (Fly-by?)
- Mask
- How long for?

Comparative Study > N Z Vet J. 2019 Jan;67(1):36-39. doi: 10.1080/00480169.2018.1528903.
Epub 2018 Oct 10.

Comparison of the effect of oxygen supplementation using flow-by or a face mask on the partial pressure of arterial oxygen in sedated dogs

A M Wong [1], E Uquilla

(SE 0.741) mmHg; p<0.001). The mean PaO_2 in samples taken after receiving either form of oxygen supplementation was higher than in samples taken after the dogs had been breathing room air (82.43 (SE 2.143) mmHg; p<0.001). There was no association between sex, age, weight or breed of dogs and blood gas parameters or rectal temperature (p>0.05). CONCLUSIONS Oxygen supplementation delivered using a face mask was more effective at increasing PaO_2 than flow-by oxygen supplementation. Flow-by oxygen supplementation at a distance of 2 cm from the nose may be a suitable alternative when the use of a face mask is not tolerated by the patient.

Keywords: Dogs; blood gas analysis; face mask oxygenation; flow-by oxygenation; oxygen supplementation; partial pressure of arterial oxygen.

TABLE 2 Average Achieved FiO_2 Associated With Oxygen Supplementation Technique

SUPPLEMENTAL OXYGEN TECHNIQUE	AVERAGE FIO_2 ACHIEVED (%)
Flow-by oxygen	25–40
Facemask	35–60
Oxygen hood	30–50
Oxygen cage	21–60
Unilateral nasal line	30–50
Bilateral nasal lines	30–70
Intubation (anesthesia machine)	100
Intubation (mechanical ventilator)	21–100

Adapted from Sumner and Rozanski.[3]

Comparison of time to desaturation between preoxygenated and non-preoxygenated dogs following sedation with acepromazine maleate and morphine and induction of anaesthesia with propofol

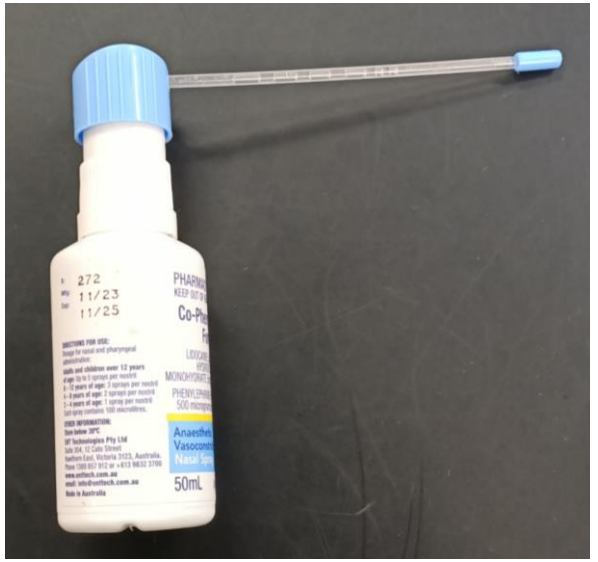
- McNally et al, 2007
- Morphine and acepromazine
- Room air or oxygen for 3 minutes

3) Induction – are you ready for it?

- Flush
- Induction agent
- Tie
- Laryngoscope - functional
- Lidocaine spray (if cat)
- ETTs
- Anaesthetic machine

4) Spraying Lidocaine

- Can drop lidocaine directly on the larynx or…
- Pre-load
- Pre-load at same angle



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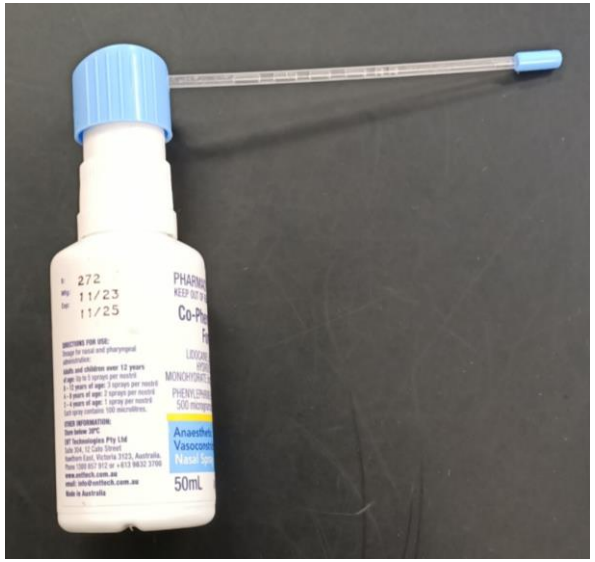
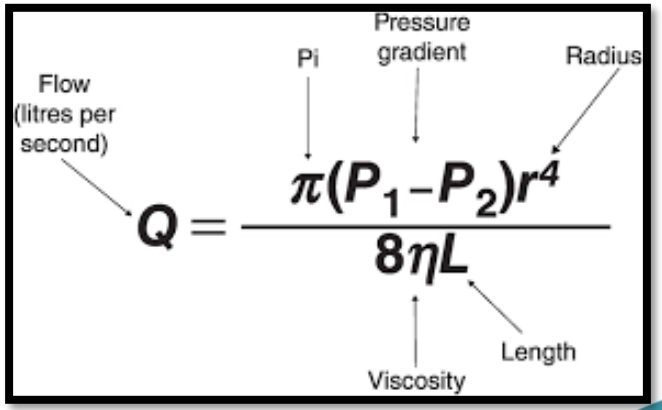


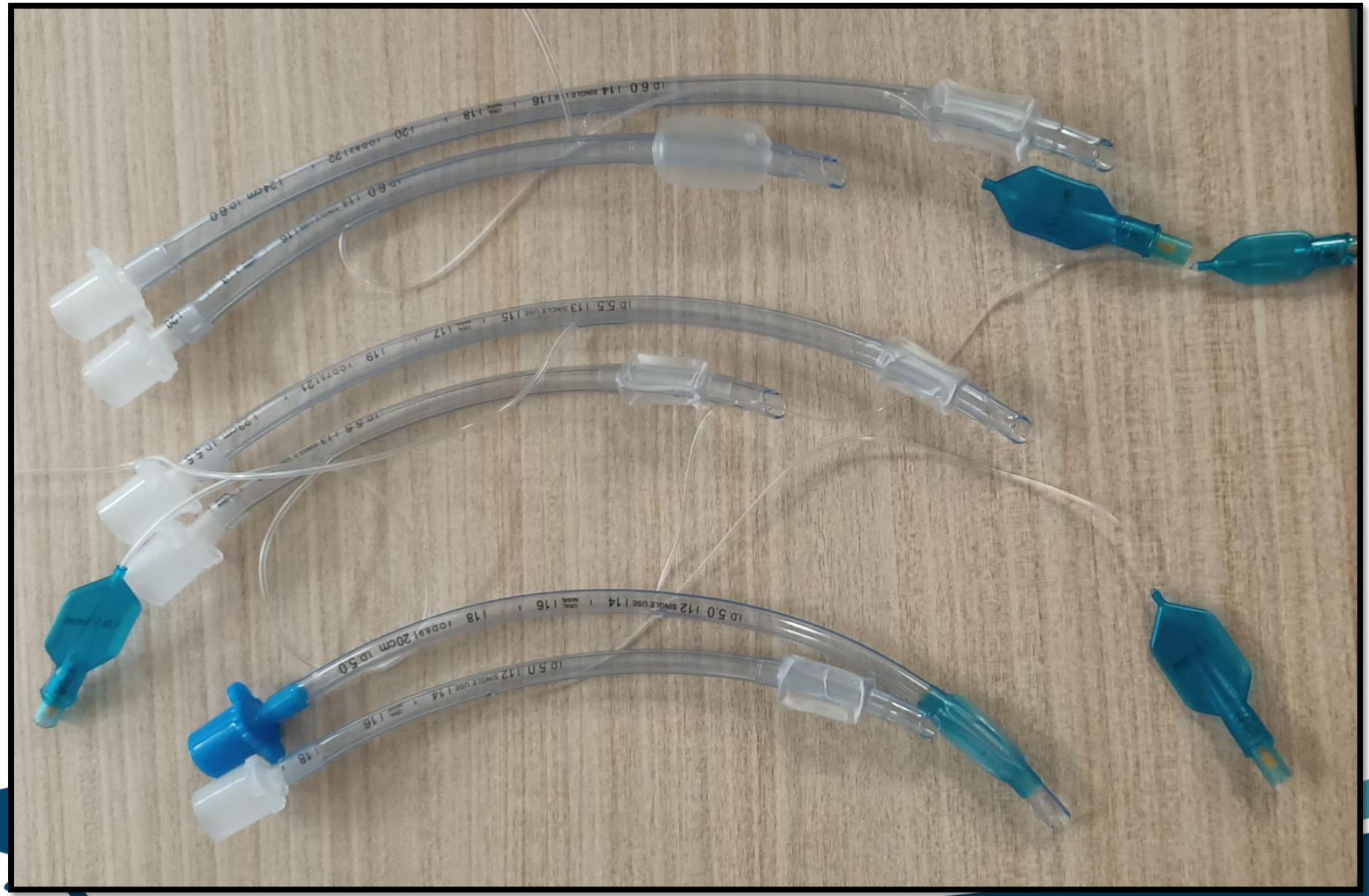
5) ETT – Does size and length matter?

- Size
  - Hagen-poiseuille
  - wider the radius, the less resistance to air flow
  - 20 kg rule

$$R = \frac{8\eta l}{\pi r^4}$$

- Length
  - nostrils to the point of the shoulder
  - past the larynx
  - not past the tracheal bifurcation




ID 6.0 114 SINGLE USE 116 118 120 122 124cm ID 6.0
ID 5.5 113 SINGLE USE 115 117 119 121cm ID 5.5
ID 5.0 112 SINGLE USE 114 116 118 120cm ID 5.0

6) Intubation – are you ready for it?

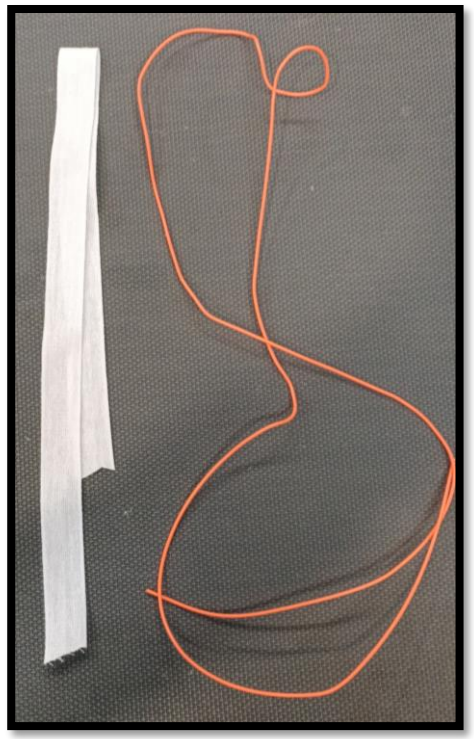
- Head up with tie behind the canines

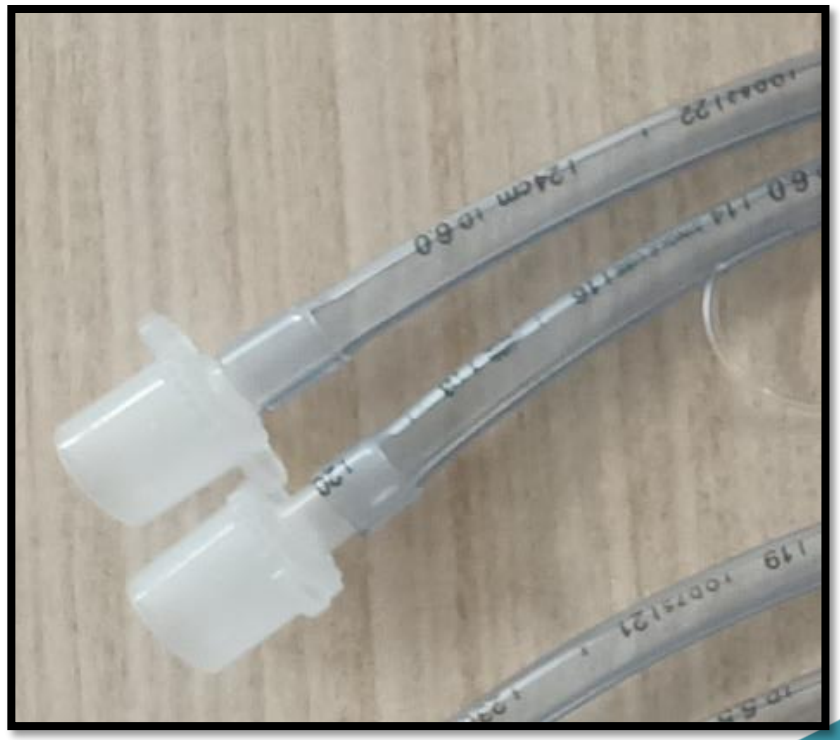
- Do not put your fingers in the mouth to get the tongue!
- Laryngoscope

- Follow curve of the ETT
- Allow to rotate if it wants to

7) Tie-ing up

- What to tie with?
- Pre-tie?
- Where to tie on tube?
- Where to tie on the animal?





8) Inflating the cuff

- How do we put air in?
- How much air do we put in?
- Use an appropriately sized syringe

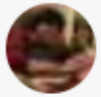
ORIGINAL RESEARCH article

Front. Vet. Sci., 06 February 2020

Sec. Veterinary Surgery

Volume 7 - 2020 | https://doi.org/10.3389/fvets.2020.00039

Evaluation of Endotracheal Tube Cuff Pressure and the Use of Three Cuff Inflation Syringe Devices in Dogs

Wan-Chu Hung[1†] Jeff C. Ko[1*] Ann B. Weil[1]  Hsin-Yi Weng[2]

[1] Department of Veterinary Clinical Sciences, College of Veterinary Medicine, Purdue University, West Lafayette, IN, United States

[2] Department of Comparative Pathobiology, College of Veterinary Medicine, Purdue University, West Lafayette, IN, United States

Conclusions

Go to: ▸

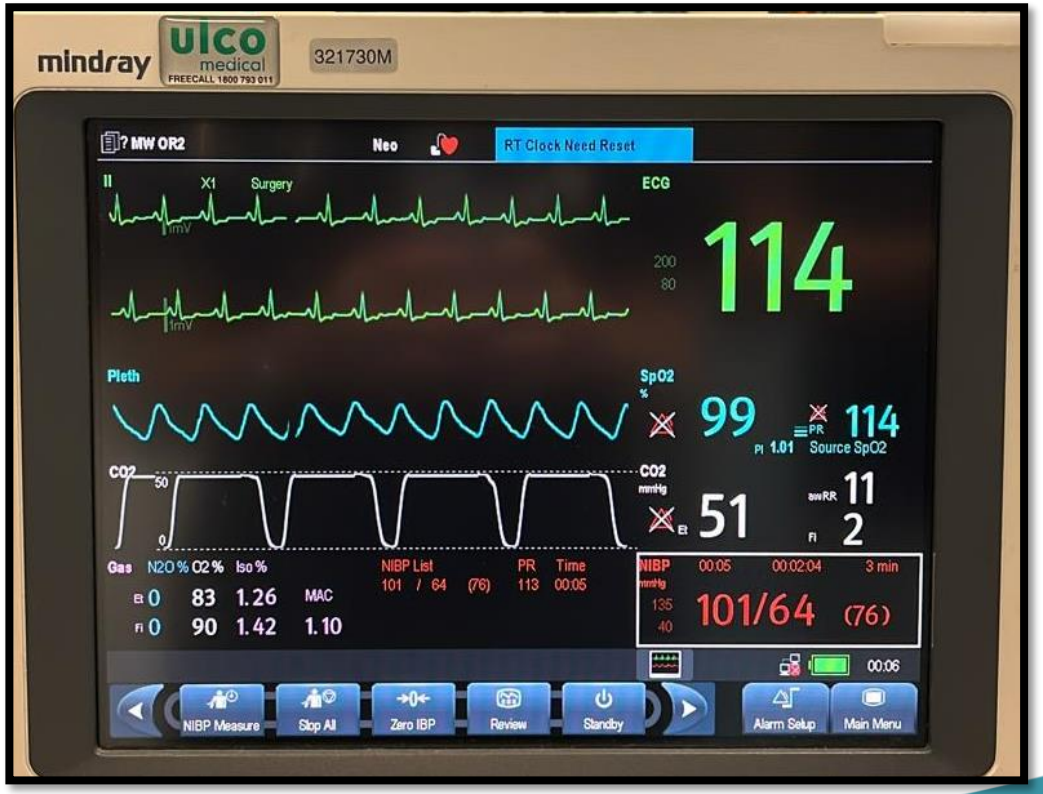
Improper ETT cuff inflation was as high as 86% in the anesthetized dogs when a regular injectable syringe coupled with the MOV technique was used. Both Tru-Cuff™ and AG Cuffill syringes effectively reduced the improper ETT cuff inflation in the same setting. When all three syringe devices were compared, the AG Cuffill syringe had the best performance for inflating ETT cuff to the defined safe pressure range. The ETT cuff pressure decreased over time during anesthesia regardless of the mode of ventilation, therefore continuous monitoring of ETT cuff pressure is strongly recommended. Finally, a total of 33% of the enrolled dogs did not require ETT cuff inflation. Brachycephalic breed dogs were less likely to require ETT cuff inflation when comparing with non-brachycephalic breed dogs. However, a subsequent air leakage can develope within the first 10 min after endotracheal intubation. This finding emphasized the importance of continuous ETT cuff monitoring for anesthetized dogs.

9) Monitoring ready to go – are you ready for it

- Capnography – attached to the circuit
- Pulse oximeter
- Blood pressure device
- Thermometer
- ECG

Capnography

- Confirms that our ETT is in the right place
- Ventilation
- Perfusion



Pulse oximetry

SPECIAL ARTICLE | VOLUME 99, ISSUE 5, P617-623, NOVEMBER 2007

Download Full Issue

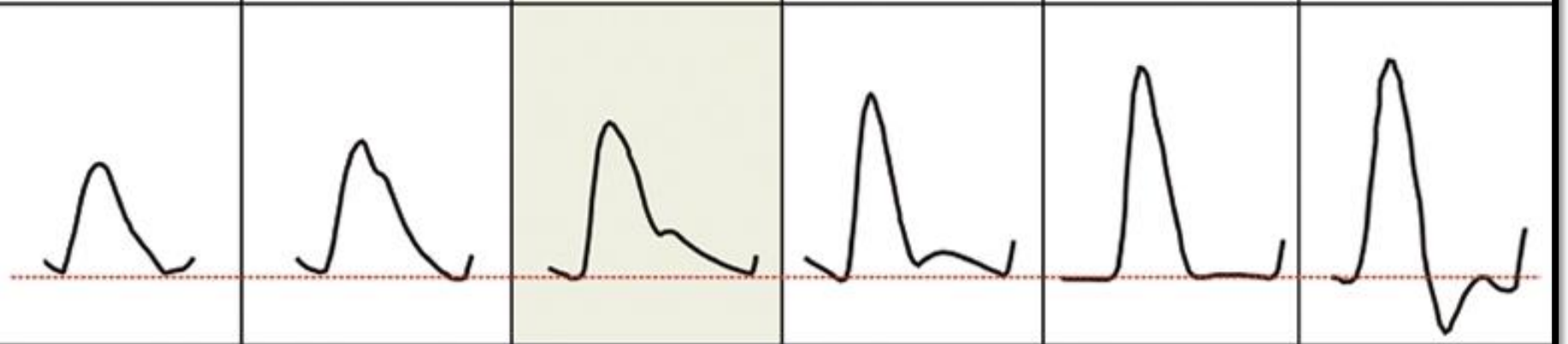
Risk factors for anaesthetic-related death in cats: results from the confidential enquiry into perioperative small animal fatalities (CEPSAF)†

D.C. Brodbelt • D.U. Pfeiffer • L.E. Young • J.L.N. Wood • Show footnotes

Open Archive • DOI: https://doi.org/10.1093/bja/aem229

odds of anaesthetic and sedation-related death. Pulse and pulse oximetry monitoring were associated with a reduction in odds. Increasing ASA physical status by one category (ASA I–II to ASA III and ASA III to ASA IV–V) was associated with a three-fold increase in odds of death. An increase of one increment in urgency (scheduled to urgent to emergency) was

Pulse Shape

Vascular tone	Vasocontriction		Normal	Vasodilation		
	severe	*moderate*		*slight*	*moderate*	*severe*
PPG waveform shape						
Amplitude	↓↓↓	↓↓	=	↑	↑↑	↑↑↑
Notch position	↑↑↑	↑↑	=	↓	↓↓	↓↓↓

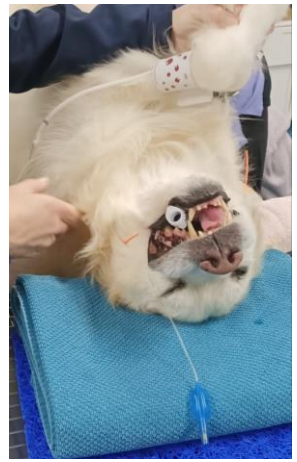
10) Temperature

- Monitor and treat temperature from very beginning
- Warm throughout
- Consider how heat is lost

11) Rolling animals

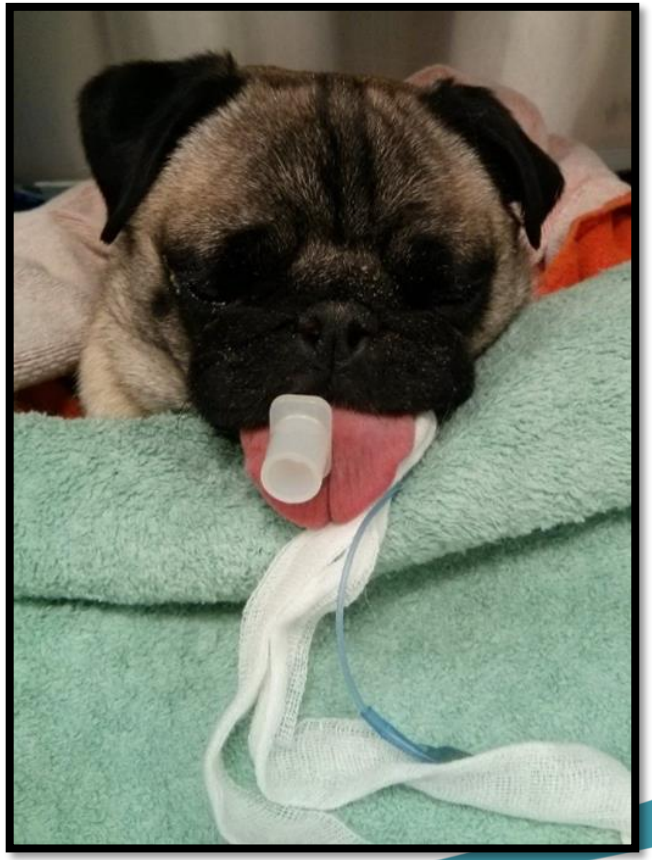
- Legs Over or under?
- Dentals
- Ear flushes
- Always think about regurgitation potential






12) Recovery

- Express bladder?
- Sternal
- Head up on towel
- When to extubate?
- When to deflate cuff?
- How much to deflate the cuff?



2020 AAHA Anesthesia and Monitoring Guidelines for Dogs and Cats*

Tamara Grubb, DVM, PhD, DACVAA†, Jennifer Sager, BS, CVT, VTS (Anesthesia/Analgesia, ECC)†, James S. Gaynor, DVM, MS, DACVAA, DAIPM, CVA, CVPP, Elizabeth Montgomery, DVM, MPH, Judith A. Parker, DVM, DABVP, Heidi Shafford, DVM, PhD, DACVAA, Caitlin Tearney, DVM, DACVAA

ABSTRACT

Risk for complications and even death is inherent to anesthesia. However, the use of guidelines, checklists, and training can decrease the risk of anesthesia-related adverse events. These tools should be used not only during the time the patient is unconscious but also before and after this phase. The framework for safe anesthesia delivered as a continuum of care from home to hospital and back to home is presented in these guidelines. The critical importance of client communication and staff training have been highlighted. The role of perioperative analgesia, anxiolytics, and proper handling of fractious/fearful/aggressive patients as components of anesthetic safety are stressed. Anesthesia equipment selection and care is detailed. The objective of these guidelines is to make the anesthesia period as safe as possible for dogs and cats while providing a practical framework for delivering anesthesia care. To meet this goal, tables, algorithms, figures, and "tip" boxes with critical information are included in the manuscript and an in-depth online resource center is available at aaha.org/anesthesia. (*J Am Anim Hosp Assoc* 2020; 56:■■■–■■■. DOI 10.5326/JAAHA-MS-7055)

AFFILIATIONS

From Washington State University College of Veterinary Medicine, Pullman, Washington (T.G.); University of Florida Veterinary Hospitals, Gainesville, Florida (J.S.); Peak Performance Veterinary Group, Breckenridge, Colorado

Other recommendations are based on practical clinical experience and a consensus of expert opinion. Further research is needed to document some of these recommendations. Because each case is different, veterinarians must base their decisions on the best available scientific ev-

into the esophagus to increase pH.[48] Maropitant prevents vomiting, promotes more rapid return to normal feeding, and improves the quality of recovery from anesthesia but appears to have a lesser effect on the incidence of reflux or regurgitation.[49] Metoclopramide, ranitidine, and omeprazole plus maropitant also appear to have a minimal impact on regurgitation.[50,51] GER and regurgitation was minimized when cisapride 1 mg/kg was combined with omeprazole 1 mg/kg.[52] However, as GER and regurgitation cannot be consistently prevented, the use of gastroprotectants, such as omeprazole 1 mg/kg at least twice (evening prior and morning of anesthesia), can be considered for the neutralization GER pH in at-risk patients.[50]

Step 4e. Recovery from Anesthesia

Although many complications occur throughout anesthesia, between 47 and 60% of all anesthetic-related dog and cat deaths, respectively, occur during the postoperative period of anesthesia, with most occurring within the first 3 hr.[4–6] Thus, patient care and monitoring of the recovering patient by trained personnel is critical and should be maintained with the same vigilance as during the maintenance phase of anesthesia. The anesthetist should continue monitoring specific patient physiologic parameters such as HR/RR (respiratory rate), SpO_2, BP, and body temperature. Patients should be closely observed until they are alert, normothermic, and ambulatory (unless nonambulatory preoperatively). An optimal recovery time (within 10–30 min of the end of anesthesia) for dogs and cats will depend on the patient health status, type of anesthetic technique used (i.e., inhalant versus injectable), duration of anesthesia, and body temperature.

In case sedatives, analgesics, or emergency resuscitative drugs are needed, intravenous catheters should be left in place until the patient is extubated and in sternal recumbency with physiologic ETT to assess ventilation until the patient is extubated.[53] In addition, a pulse oximeter should be used throughout recovery to assess the degree of oxygen saturation.

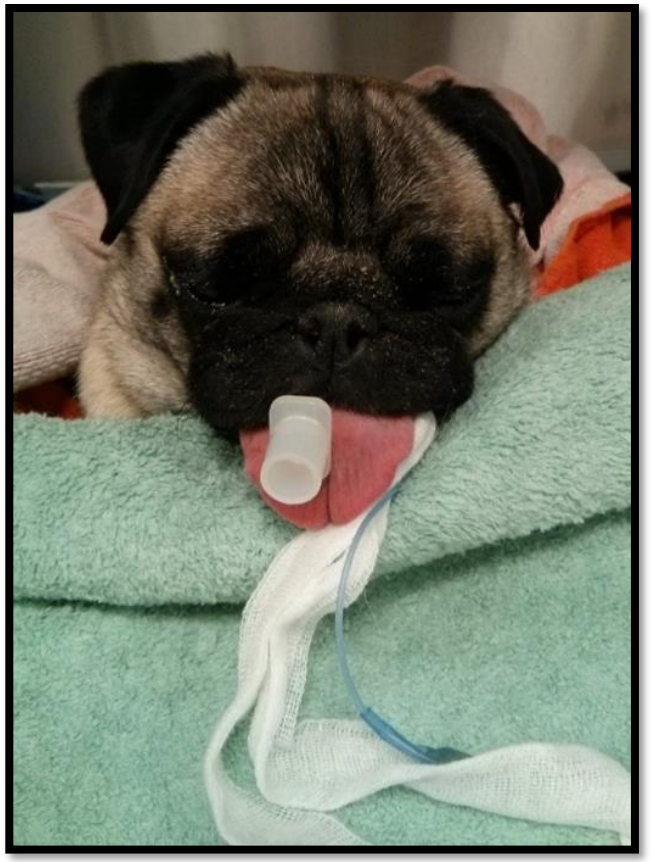
Numerous factors can impact the quality of recovery and should be addressed to aid the patient's smooth emergence from anesthesia. Environmental stress, bright lights, excessive noise, and a cold environment can attribute to the patient's discomfort following anesthesia. Bladder distension can be very uncomfortable. Express the bladder to minimize any discomfort, especially for those patients who may be nonambulatory and unable to urinate on their own in the immediate postoperative period.

Delayed recovery, dysphoria, and emergence delirium are common complications in the postoperative period. Delayed recovery can be caused by excessive anesthetic depth during the maintenance phase. This can not only prolong the recovery phase but also negatively impact the respiratory, cardiovascular, and thermoregulatory systems. Hypothermia (body temperature <98°F [36.7°C]) can lead to multiple physiologic complications, including delayed drug metabolism, further prolonging the patient's recovery.[46] Patient warming devices should be used throughout the recovery phase.[46,53] Certain drugs can cause peripheral vasoconstriction (e.g., alpha-2 agonists) or vasodilation (e.g., inhalants), modifying the heat loss from the patient and influencing the effectiveness of external warming devices.[46,47] Hypoglycemia, especially in small or neonatal patients, can lead to a prolonged recovery, so monitor blood glucose frequently. Judiciously titrated drug antagonism may be considered if the patient's recovery is concerningly prolonged. Alpha-2 agonists should be reversed only if the patient is excessively sedate or rapid recovery is needed. Opioid effects should be antagonized only if other analgesics have been administered; otherwise, the patient could experience intolerable pain.

Dysphoric recoveries and emergence delirium can often be dif-

12) Recovery

- Express bladder?
- Sternal
- Head up on towel
- When to extubate?
- When to deflate cuff?
- How much to deflate the cuff?



Comparative Study > Vet Anaesth Analg. 2011 May;38(3):203-7.
doi: 10.1111/j.1467-2995.2011.00610.x.

The effects of extubation with an inflated versus deflated endotracheal tube cuff on endotracheal fluid volume in the dog

Amanda Vance [1], Erik H Hofmeister, Cody Laas, Jamie Williams

Affiliations + expand

PMID: 21492385 DOI: 10.1111/j.1467-2995.2011.00610.x

Abstract

Conclusions and clinical relevance: Extubation with the cuff inflated removed more liquid contents from the trachea than extubation with the cuff deflated and may assist in the prevention of pulmonary aspiration when fluid is present in the proximal trachea. The technique did not remove all fluid so the potential for pulmonary damage remains.

Veterinary Anaesthesia and Analgesia
Volume 51, Issue 3, May–June 2024, Pages 227-234

Research Paper

Incidence of and risk factors for poor recovery quality in dogs recovering from general anaesthesia—a prospective case control study

Heather Jones, Katherine Robson, Thomas Maddox, Briony Alderson

- 247 dogs
- 29.1% experienced a poor recovery
- Half of these required sedation to manage the behaviour assoc with the poor recovery
- Increased incidence seen in the ASA I – II
- Not necessarily pain related

13) Analgesia!!!!

- Signs of pain: vocalisation, restlessness, panting, aggression if painful areas palpated
- Assess, Treat and Re-assess response
- Don’t confuse for anxiety: vocalising and restlessness

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Thank you and Questions?

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