Paper

Assessment of v-gel supraglottic airway device placement in cats performed by inexperienced veterinary students

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Endotracheal intubation has been associated with several complications in cats. The v-gel supraglottic airway device (SGAD) has been developed to adapt to the unique oropharynx of the cat and to overcome these complications. Thirty-three cats were randomly assigned to receive an endotracheal tube (ETT group) or a v-gel SGAD (v-gel group) after induction of general anaesthesia. Third year veterinary students without previous clinical experience placed these devices under direct supervision of an anaesthesiologist. Amount of propofol, number of attempts, time required to secure the airway, leakage around the device, signs of upper airway discomfort and food consumption were compared between the two groups. The v-gel group required less propofol (P=0.03), less time (P<0.01) and fewer attempts (P<0.01) to secure the cats' airway. The incidence of leakage was lower for the v-gel group immediately after placement of the device (P<0.01) and 60 minutes after induction of general anaesthesia (P=0.04). Cats that received the v-gel SGAD presented a lower incidence of upper airway discomfort immediately after the device was removed (P=0.03) and recorded a higher food consumption score (P=0.03). The v-gel SGAD is a feasible way to secure the airway of healthy cats when performed by inexperienced personnel.

Introduction

General anaesthesia is commonly used by veterinary practitioners in feline medicine. Despite the routine nature of anaesthesia, there is a significant risk of perioperative fatality (Brodbelt and others 2008). Several factors are associated with increased peri-anaesthetic mortality in cats, such as increasing American Society of Anesthesiologists (ASA) status, procedural urgency, major versus minor procedures, increasing age, extremes of weight, endotracheal intubation and fluid therapy. Of these factors, endotracheal intubation was associated with a twofold increase in odds of death (Brodbelt and others 2007). Although endotracheal intubation is considered the standard method to secure the airway, it is associated with several complications in the cat, which include tracheal rupture (Mitchell and others 2000, Bauer and others 2009), tracheal stricture (Culp and others 2007), trauma to the arytaenoids (Hofmeister and others 2007), laryngospasm (Hofmeister and others 2007, Brodbelt 2010) and laryngeal oedema (Brodbelt 2010).

Complications related to endotracheal intubation have also been reported in people and include oral trauma (i.e. lip, tongue, or oral cavity lacerations or contusions) (Mourao and others 2011), dental trauma (Adolphs and others 2011, Mourao and others 2011), sore throat, laryngospasm, hoarseness (Rafiei and others 2012) and tracheal trauma due to introducers (Hodzovic and others 2008). More serious complications related to endotracheal tubes (ETTs) and introducers are tracheal or bronchial rupture (Sahin and others 2012, Xu and others 2014) and oesophageal or endobronchial intubation (Timmermann and others 2007). Due to these issues and relative difficulty in endotracheal intubation, a supraglottic device, the laryngeal mask airway (LMA), was developed (van Zundert and others 2012). This device was designed to provide an airtight seal around the larynx while causing minimal trauma to the airway.

Due to the technical difficulty in orotracheal intubation of the rabbit (Tran and others 2001, Bateman and others 2005), LMAs have also been utilised as an alternative method for airway management in this species (Bateman and others 2005). Studies have shown that LMAs in rabbits were easy to insert, but they had the potential of causing lingual cyanosis, gastric tympany, laryngeal oedema and air leak around the cuff (Bateman and others 2005, Kazakos and others 2007, Uzun and others 2015). These studies utilised an LMA that was specifically designed for human oropharyngeal anatomy. Recently, the v-gel supraglottic airway device (SGAD) has been developed to adapt to the unique anatomy of the rabbit oropharynx. This device better conforms to the larynx of the rabbit and prevents air leaks and damage to soft tissue structures (Crotaz 2010, Uzun and others 2015). In a pilot study, Crotaz concluded that the v-gel SGAD was easy to insert and the device was a reasonable alternative to endotracheal intubation (Crotaz 2013).

Laryngeal masks have also been evaluated in cats. One study found that the LMAs provided an airtight seal around the larynx

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and were adequate to maintain oxygenation and ventilation in adult cats. The LMAs used in this study were designed for people and had a large amount of dead space compared with ETTs (Cassu and others 2004). More recently, a v-gel SGAD was designed to fit the feline larynx and oropharynx. This device consists of a non-inflatable cuff that forms a seal around the laryngeal inlet and an inflatable dorsal pressure adjuster that can increase seal pressure (Crotaz 2010). Previous studies have shown that correct placement of the v-gel SGAD in cats was easily achieved on the first attempt and the device provided a secure airway (van Oostrom and others 2013, Prasse and others 2015).

In people, SGADs showed advantages over standard endotracheal intubation. In both children and adults, the use of LMAs resulted in decreased incidence of postoperative cough and laryngospasm (Yu and Beirne 2010, Luce and others 2014). Similar results have been found in cats, where the incidence of postanaesthetic stridor was decreased when v-gel SGADs were used versus cats that were endotracheally intubated (van Oostrom and others 2013). Other benefits of SGADs in the cat are faster control of the upper airway, less induction agent required and decreased leakage of inspired gases when controlled ventilation is applied. In people and cats, the placement of an SGAD was found to be more rapid than standard endotracheal intubation (van Oostrom and others 2013, Prasse and others 2015).

The purposes of this study were to evaluate the time and the number of attempts required by inexperienced individuals to successfully place the v-gel SGAD versus an ETT in healthy cats and to determine leakage around the device before and after moving the animal from the preoperative surgical preparation room into the operating room. Additionally, changes in postanaesthetic behaviour, such as eating, coughing and laryngeal discomfort were compared between cats with a v-gel SGAD and cats that were endotracheally intubated. The authors' hypotheses were that the v-gel SGAD would require less time and attempts to secure the airway, no difference in leakage would be found after moving the animal, and less postoperative airway complications would occur when compared with the endotracheal intubation.

Materials and methods

Animals

Thirty-three female domestic shorthair cats between 1 month and 24 months of age and weighing between 0.8 kg and 4.1 kg were enrolled in the study. The cats were brought to the Veterinary Teaching Hospital by the local Humane Shelter and underwent general anaesthesia for ovariohysterectomy in a student surgery laboratory. All animals were housed in a climate-controlled facility at the University of Georgia and were assessed as healthy based on physical examination and determination of packed cell volume and total protein. This study was approved by the University of Georgia Institutional Animal Care and Use Committee.

Experimental design

A prospective, blind, randomised design was used for this study. Food, but not water, was withheld for eight hours before the procedure. Cats were premedicated with 0.02 mg/kg atropine (AtroJet SA, Butler Schein Animal Health, Ohio, USA), 0.02 mg/kg acepromazine (PromAce, Boehringer Ingelheim Vetmedica, Missouri, USA), 0.01 mg/kg buprenorphine (Buprenex, Reckitt Benckiser Healthcare, UK) and 4 mg/kg intramuscular ketamine (KetaVet, Vedco, Missouri, USA). Twenty minutes after premedication, a 22-gauge catheter (Terumo Medical Corporation, Maryland, USA) was placed in the cephalic vein and general anaesthesia was induced with 6 mg/kg to effect intravenous propofol (PropoFlo, Abbott Laboratories, Illinois, USA).

Cats were assigned by a random number generator to receive a v-gel SGAD (Docsinnovent, UK), v-gel group, or a high volume-low pressure cuff Murphy-type ETT (Sheridan, Teleflex Medical, North Carolina, USA), ETT group. Immediately after induction of general anaesthesia, cats were positioned in sternal recumbency and 0.2 ml of 2 per cent lidocaine (Lidocaine HCL, Hospira, Illinois, USA) was applied to the arytaenoids. One minute after the lidocaine application, the level of anaesthesia was assessed with palpebral reflex, jaw tone, swallowing reflex and movement of the tongue when touched by the anaesthetist. When loss of these reflexes was achieved, the student attempted to place the airway device.

Thirty-three third year veterinary students, who were attending the anaesthesia and surgery laboratory and had no previous clinical experience in the Teaching Hospital, were randomly assigned to use either a v-gel SGAD or an ETT. Following induction, the student attempted to place the airway device under direct supervision of a board certified anaesthesiologist. The placement attempt was defined as insertion of the v-gel SGAD in the oropharynx or insertion of the ETT between the arytaenoids. The attempt was considered unsuccessful if cough or laryngospasm were present. If the ETT was placed in the oropharynx and the advancement was unsuccessful without cough or laryngospasm, the student was allowed to adjust and reposition the ETT once during the same attempt. Students were allowed three attempts and during this time, if the cat was deemed not to be adequately anaesthetised, a bolus of 1 mg/kg propofol was administered intravenously over 10 seconds. The time elapsed from the first dose of propofol to placement of airway device, number of attempts and amount of propofol required were recorded.

After placement, the ETT and v-gel SGAD were secured around the animal's neck with roll gauze and the cat was moved into the operating room. Anaesthesia was maintained with isoflurane (IsoFlo, isoflurane USP; Abbott Laboratories, Illinois, USA) in 100 per cent oxygen delivered at a flow 2 l/minute via a rebreathing system. Heart rate measured via auscultation, blood pressure measured via Doppler, rectal temperature via thermometer, and respiratory rate, oxygen saturation by pulse oximetry (SpO_2), and end-tidal carbon dioxide ($ETCO_2$) measured using a multiparameter device (POET IQ 602, Criticare Systems, Wisconsin, USA), were monitored and recorded every five minutes. The students manually ventilated the cats throughout the procedure to a peak inspiratory pressure of 12 cm H_2O to maintain an $ETCO_2$ between 35 mm Hg and 45 mm Hg. Body temperature was maintained within normal limits (37.5–39° C) with under-the-body water circulating blankets (TP-700, Gaymar Industries, New York, USA) and all animals received an intravenous balanced electrolyte solution (Veterinary Lactated Ringer's Injection USP, Abbott Laboratories, Illinois, USA) at a rate of 5 mL/kg/hour during the procedure. A line block using lidocaine at 2 mg/kg was performed before the linea alba was surgically dissected. At the end of the procedure, cats received 0.02 mg/kg intravenous buprenorphine and 0.1 mg/kg subcutaneous meloxicam (Eloxiject, Butler Schein Animal Health, Ohio, USA), and isoflurane was discontinued. Animals were allowed to breathe oxygen for five minutes or until the airway device was no longer tolerated. After the ETT or the v-gel was removed, the cat was observed for a minimum of 20 minutes for signs of upper airway discomfort, such as cough, stridor and difficulty breathing. Animals were returned to their cages when their body temperature reached at least 38°C and they were able to ambulate without significant ataxia.

Airway device placement

The day before the surgery laboratory, the students attended a one-hour lecture where they were taught how to manage the cats under general anaesthesia. During this lecture, an anaesthesiologist (MB) explained how to correctly place the ETT and the v-gel SGAD, using videos provided by the manufacturer (http://docsinnovent.com/videos).

The ETT size ranged from 3 mm to 4 mm in internal diameter and the size was selected according to the Teaching Hospital's guidelines. After application of lidocaine on the

arytaenoids, the ETT was lubricated and inserted with the aid of a laryngoscope; the cuff (low pressure, high volume) was then inflated, if necessary, until no leak was detected at airway pressure of 12 cm H_2O.

The v-gel SGAD (sizes C1, C2, C3 and C5) was inserted following the manufacturer's guidelines (http://docsinnovent.com/training/cat-v-gel). Briefly, after application of lidocaine on the arytaenoids and lubrication of the device, the v-gel SGAD was inserted with the cuff opening facing ventrally and it was advanced until resistance to the insertion was felt.

Students were allowed no more than three attempts using either device and, if the third attempt was unsuccessful, the anaesthesiologist (MB) completed the procedure.

Leakage assessment

Leakage around the ETT and the v-gel SGAD was assessed by the same anaesthesiologist (MB) during manual ventilation using three modalities: (a) direct auscultation and detection of isoflurane odour around the cat's mouth; (b) analysis of the CO_2 waveform; (c) detection of inhalant anaesthetic in the oral cavity using an electronic leak detector (Leak-seeker LS780B, CPS Products, Florida, USA). The assessment of leakage was performed after the placement of the device in the cat's oropharynx, after the animal was moved into the operating room and repositioned on the surgery table in dorsal recumbency, and during the surgical procedure, approximately 60 minutes after induction. During transportation, the airway device was disconnected from the anaesthesia machine and then reconnected in the operating room after the cat was correctly positioned on the surgical table.

If any of these modalities tested positive for leakage, repositioning of the airway device and inflation of the cuff were performed. If this procedure could not eliminate the leak, the v-gel SGAD and ETT were removed and substituted with a more appropriate sized ETT and the animal was removed from the trial.

Postoperatory assessment

Six hours after recovery, an evaluator (SAK), who was unaware of the group allocation, assessed the animal's behaviour. The evaluator first observed the animal for any signs of upper airway discomfort, such as salivation, excessive swallowing, stridor, coughing, hoarseness and retching. Then gentle palpation of the trachea was applied and the reaction was recorded. A gentle palpation of the abdominal incision was also applied to exclude discomfort cause by the surgical procedure. If the animal vocalised, hissed, tried to bite or escape, the response to abdominal pain was positive and 0.02 mg/kg buprenorphine was administered intravenously. Lastly, dry and wet food was offered and the animal's reaction was observed from a distance for at least 15 minutes. The interest in food was considered positive if the cat approached the bowl and smelled the content and food consumption was recorded.

Statistical analysis

Normality for age, bodyweight, amount of propofol and time required to achieve endotracheal intubation, duration of surgery and retention of ETT or v-gel SGAD was determined using a D'Agostino-Pearson test. An unpaired t test analysis was used to compare bodyweight and time elapsed from placement to removal of the airway device and a Mann-Whitney U test was used to compare age, amount of propofol used to achieve induction of general anaesthesia, number of attempts the students required to place the airway device, and surgery time, between the ETT and the v-gel groups. A Fisher's exact test was used to determine differences between the two groups in successful placement of the airway device accomplished by the students, leakage around the device immediately after placement, after transportation into the operating room, and 60 minutes after induction of general anaesthesia, signs of upper airway discomfort immediately after and six hours after removal of the airway device, and interest and consumption of food. After excluding cats that presented discomfort on abdominal palpation, a Fisher's exact test was used again to compare interest and food consumption between the ETT and the v-gel groups. All analyses were carried out with a commercially available statistical software Prism V.6.0 (GraphPad Software, California, USA). Parametrical values were expressed as mean±SD and non-parametrical values were expressed as median (interquartile range, IQR). Values of $P<0.05$ were considered statistically significant.

Results

Seventeen cats were assigned to the ETT group and 16 to the v-gel group. The mean±SD bodyweight of the cats was 1.9 ±0.8 kg and 1.9±0.9 kg and age was 4.0 months (IQR 3.3–12 months) and 4.0 months (IQR 4.0–6.0 months) for the ETT group and the v-gel group, respectively. No statistically significant difference was found in bodyweight ($P=0.98$) or in age ($P=0.74$) between the two groups. A higher amount of propofol ($P=0.03$) was used for endotracheal intubation, 5.6 mg/kg (IQR 4.1–6.7 mg/kg), compared with the amount used to place the v-gel SGAD, 4.1 mg/kg (IQR 4.0–4.9 mg/kg) (Fig 1). The number of times the student attempted ($P<0.01$) and time required to place the airway device ($P<0.01$) (Fig 2) was significantly higher for students using the ETT compared with v-gel SGAD. Students successfully intubated only 47.1 per cent of cats, while 100 per cent of students were able to correctly place the v-gel SGAD ($P<0.01$). No complications were recorded during the induction of general anaesthesia. Placement of the ETT was completed by the anaesthesiologist in 9 out of 17 cats.

A higher incidence of leakage around the airway device was detected in the ETT group immediately after placement ($P<0.01$) and 60 minutes after induction of general anaesthesia ($P=0.04$) when compared with the v-gel group, but no difference was found after moving the animals in the operating room ($P=0.22$) (Table 1). Inflation of the ETT cuff and repositioning of the v-gel SGAD was sufficient to address all leaks and re-intubation with a bigger size ETT was not necessary. The tongue of one cat in the v-gel group became congested and cyanotic after the animal was moved into the operating room. After repositioning the v-gel SGAD, an ice pack was applied to the tongue and the animal recovered without further complications. One cat in the ETT group was accidentally extubated during the ovariohysterectomy. Due to the small size of the animal, 1.6 kg bodyweight, and the position in dorsal recumbency the anaesthesiologist attempted orotracheal intubation three times

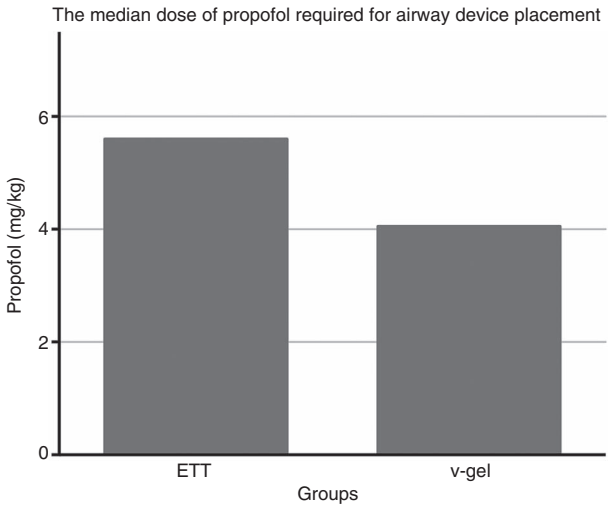

FIG 1: Bar chart of the median propofol used by third year veterinary students to place the endotracheal tube (ETT) or the v-gel supraglottic airway device (v-gel SGAD) in cats. The amount of propofol was significantly higher for cats receiving an ETT compared with a v-gel SGAD ($P=0.03$)

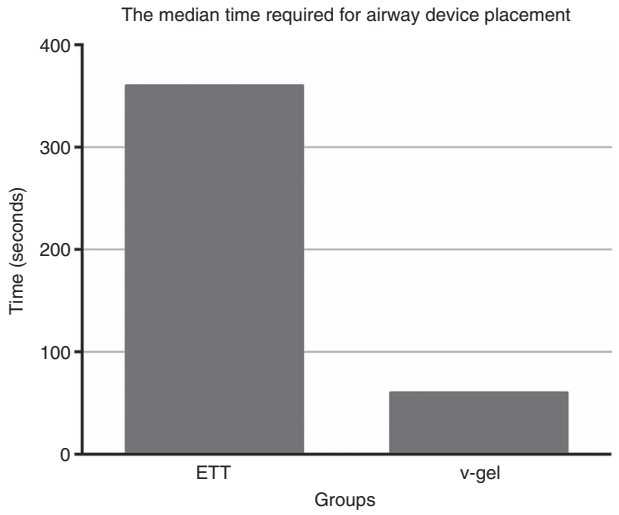

FIG 2: Bar chart of the median time required by third year veterinary students to place the endotracheal tube (ETT) or the v-gel supraglottic airway device (v-gel SGAD) in cats. The amount of time was significantly higher to place the ETT compared with the v-gel SGAD (P<0.01)

without success. A v-gel SGAD was placed instead and the cat was removed from the study. No other complications were noticed and the subject recovered uneventfully.

No statistically significant difference was found in the time required to complete the surgical procedure, 104 min (IQR 89–115 min) and 99 min (IQR 91–109 min) for ETT and v-gel groups, respectively (P=0.69), and time that the airway device was applied to the animal's airway, 154±21 min and 157 ±23 min for ETT and v-gel groups, respectively (P=0.65). Upper airway discomfort (stridor, coughing, hoarseness or retching) at the time of airway device removal was noticed in 75 per cent of cats in the ETT group and in 31.3 per cent in the v-gel group (P=0.03) (Table 1).

Postoperative evaluation, six hours after the anaesthetic event, revealed that only 12.5 per cent of cats in the ETT group showed signs of upper airway discomfort upon tracheal palpation, versus 0 per cent in the v-gel group (P=0.48). Sixty-eight per cent of animals in both groups showed interest in food (P=1.0) and only 25.0 per cent in the ETT group and 62.5 per cent in the v-gel group ate the food (P=0.07). Five cats in the ETT group and seven cats in the v-gel group presented signs of discomfort on abdominal palpation. When these subjects were excluded from the behavioural evaluation towards food, no difference was found in interest (P=0.64), but the number of cats that ate was significantly higher in the v-gel group, 77.8 per cent, compared with the ETT group, 25 per cent (P=0.03) (Table 2). All cats recovered without complications and returned to the local Humane Shelter the following day.

Discussion

The main finding of this study is that students without experience with endotracheal intubation in cats required significantly less time, less amount of induction agent and less attempts when placing a v-gel SGAD versus an ETT. The rate of success in inserting the airway device was also higher with the v-gel, confirming that students performed significantly better when using a v-gel SGAD.

Another study showed that the time required to secure the airway with the v-gel SGAD in cats was significantly lower than with the ETT when the procedure was performed by one experienced anaesthetist (van Oostrom and others 2013). This was confirmed in the present study even when a group of inexperienced students was involved.

The amount of propofol used to achieve intubation in the current report confirmed what Prasse and others (2015) found when only one anaesthetist placed the airway device in cats. This is in contrast with another study where there was no difference in dose of propofol used between the v-gel and ETT groups (van Oostrom and others 2013). The cats in van Oostrom's study were probably more sedated after their premedication drugs, lidocaine was only used to desensitise the larynx of animals in the ETT group, and there was only one expert anaesthetist placing the airway device. These factors could have masked differences in the amount of propofol used.

In a study, the number of insertion attempts was not different between the v-gel and ETT groups (Prasse and others 2015), which was in contrast with the present results. This difference could be due to the fact that in the present study the authors enrolled inexperienced students to place the airway device, while in Prasse' s report only one anaesthetist performed the procedure. This person could have had more experience than the students of the present study and most likely gained experience after repeating the procedure several times.

Leakage around the ETT was noticed in all cats immediately after orotracheal intubation. This is not surprising due to the relaxation of the trachealis muscle following propofol

TABLE 1: Percentage of successful airway device placement accomplished by third year veterinary students, percentage of cats that presented leakage around the airway device immediately after placement, after transportation into the operating room, and 60 minutes after induction of general anaesthesia, and percentage of cats that presented upper airway discomfort (stridor, coughing, hoarseness or retching) when the airway device was removed

Group	Successful placement	Leakage after placement	Leakage after movement	Leakage 60 minutes after induction	Upper airway discomfort after device removal
ETT					
N	17	17	17	16	16
Per cent	47.1	100	35.3	31.3	75.0
v-gel					
N	16	16	16	16	16
Per cent	100*	25.0*	12.5	0.0*	31.3*

Fisher's exact test. Significance set at P<0.05
*Percentage of the v-gel group that differ significantly from percentage of the ETT group
ETT, endotracheal tube; v-gel, v-gel supraglottic airway device

TABLE 2: Evaluation of cats six hours after removal of the airway device

Group	Upper airway discomfort upon tracheal palpation	Interest in food	Food consumption	Interest in food (no pain)	Food consumption (no pain)
ETT					
N	16	16	16	11	11
Per cent	12.5	68.8	25.0	63.6	27.3
v-gel					
N	16	16	16	9	9
Per cent	0.0	68.8	62.5	77.8	77.8*

Percentage of cats presenting upper airway discomfort (stridor, coughing, hoarseness or retching) upon tracheal palpation, interested in food, and that ate the food offered. Columns 5 and 6 represent the percentage of cats that showed interest in food and ate it after excluding animals that presented signs of discomfort upon abdominal palpation
Fisher's exact test. Significance set at P<0.05
ETT, endotracheal tube; v-gel, v-gel supraglottic airway device
*Percentage of the v-gel group that differed significantly from percentage of the ETT group

administration. The incidence of leakage was significantly lower in the v-gel group, since the cuff of the device covered the glottis and the device was not inserted into the tracheal lumen. To overcome one of the limitations in the study design reported by other authors (Prasse and others 2015), the authors tested the devices for leak after the cat's position was changed. After moving the animals in the operating room, the leakage was similar between groups, but the difference became evident again at 60 minutes after induction. Leakage around the ETT was probably associated with increased muscle relaxation caused by the inhalant anaesthetic. The v-gel SGADs that presented leakage were displaced during transportation and simple readjustment of the device resolved the problem. One cat showed signs of cyanosis and congestion of the tongue, without any systemic signs of hypoxaemia. The colour of the other mucous membranes and the SpO_2 measured on the third digit were normal, suggesting that the lingual cyanosis was due to venous outflow obstruction caused by the v-gel SGAD. This has been previously reported in cats (Prasse and others 2015) and rabbits (Crotaz 2013; Uzun and others 2015). Repositioning of the v-gel SGAD and application of an ice pack on the tongue was sufficient to resolve the problem without further complications. One cat was extubated during the surgical procedure and re-intubation with an ETT was not possible. A v-gel SGAD was placed instead and the airway was quickly secured on the first attempt.

Immediately after removal of the airway device, upper airway discomfort was significantly higher in cats in the ETT group compared with the v-gel group, but this difference disappeared at six hours after the procedure. These findings are in agreement with another study in cats, where the postoperative evaluation was done by the owner at 24 hours after the anaesthetic event (van Oostrom and others 2013). This could be explained by the anti-inflammatory action of meloxicam and the potential antitussive effect of buprenorphine in both studies (Kukanich and Papich 2009). It is also possible that the judgement of the evaluator that scored the cats immediately after extubation was influenced by the device used, since this person was aware of the group allocation of the cats.

Behaviour towards food was not different between the two groups when all cats were considered. When subjects showing signs of discomfort upon abdominal palpation were excluded, high interest in food without difference between the two groups was found, but a significantly higher number of cats in the v-gel group ate compared with the ETT group. This could be explained by the fact that less tracheal inflammation was present when the v-gel SGAD was used, although a lower incidence of other complications, such as oesophagitis and gastro-oesophageal reflux, cannot be excluded.

There are some limitations to this study. Only the second part of the evaluation, at six hours after recovery, was performed by a blind observer. The placement of airway device, leakage after induction and during surgery and evaluation of upper airway discomfort immediately after recovery could not be assessed by a blind evaluator, since the airway device was visible. However, objective parameters, such as number of attempts and time required to place the airway device, amount of propofol and presence of leak were measured during this phase. To minimise the bias, only the placement technique of ETT and v-gel SGAD were explained to the students before the laboratory and, only after the study, advantages and disadvantages and ease of placement of the airway device were discussed.

The upper airway discomfort was noticed immediately after extubation. Cats often react to ETT removal especially at a light plane of anaesthesia and, in some veterinary practices, the ETT is removed before the animal reaches this plane to avoid any undesired reaction. In the present study the investigators decided to leave the ETT in place five minutes after the inhalant anesthetic was discontinued or until the airway device was no longer tolerated to decrease the risk of hypoxaemia and aspiration pneumonia. The same technique was applied to the v-gel SGAD to create the same scenario and better compare the discomfort when the two devices were use in the same way. It is possible that if the cats had been extubated at a deeper plane of anaesthesia, no difference would have been found between the two groups.

Food consumption was assessed approximately six hours after administration of buprenorphine. It is possible that this opioid induced nausea in the animals and that the behaviour towards food was influenced by the drug. However, all cats received the same dose of buprenorphine and it is reasonable to assume that the chance of interfering with food consumption was the same regardless of the group allocation.

Conclusions

Inexperienced anaesthetists had a higher success rate when placing the v-gel SGAD versus the ETT in cats and less attempts, amount of propofol and time were required to accomplish this task. Leakage around the v-gel SGAD was significantly lower immediately after placement and during the surgical procedure. Cats in the v-gel group experienced less upper airway discomfort immediately after removal of the device and higher food consumption score was recorded. The v-gel SGAD is a feasible way to secure the airway of healthy cats when this task is performed by inexperienced personnel.

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