Laryngotracheobronchoscopy Via Laryngeal Mask Airway in Cats and Small Dogs: A 16-year Experience

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Introduction

Tracheobronchoscopy in cats and small dogs is conventionally performed without intubation and has a complication rate of 30 %–40 % and a mortality rate of 5.9 %[1,2].
Laryngotracheobronchoscopy via laryngeal mask airway (LTBS–LMA, Fig.1) using a flexible bronchoscope provides a constant airway and oxygen supply during examinations, from the larynx to the lungs, and is easy to perform with the animals in the supine position. However long-term clinical studies are lacking. This study aimed to assess the practicality and safety of LTBS-LMA in cats and small dogs.

Fig 1. LTBS–LMA
Bronchoscopy was undergone with a dog in the spine position via laryngeal mask airway under fluoroscopy.

Materials and Methods

The endobronchial anatomy of dogs in the supine position and primary bronchial distribution on chest X-ray (CXR) were illustrated using four bronchoscopies, a 3D printer, and a celluloid cast of the tracheobronchial tree of healthy dogs. Subsequently, the medical records of 820 animals that underwent LTBS–LMA based on the first study between 2002 and 2019 were reviewed. Data were compared among cats (F), small dogs (S, < 5 kg), and medium-to-large dogs (ML, > 5 kg) groups. This study followed the bronchoscopic nomenclature system described for the dog[3] and the cat[4]. A P-value < 0.05 was considered statistically significant.

Results

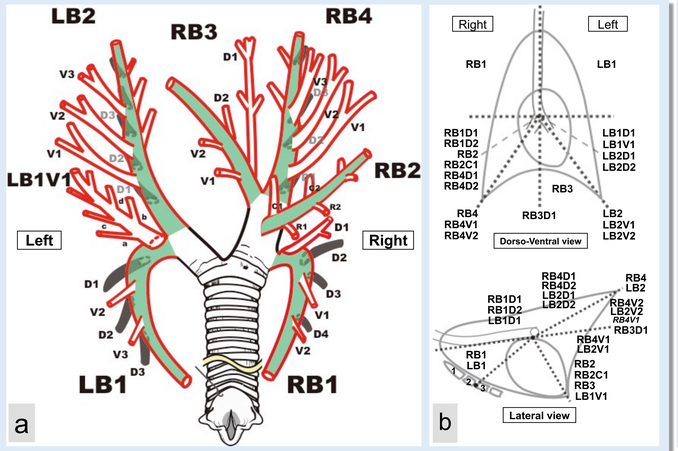

Fig 2. Tracheobronchial tree in the spine position (a) and primary bronchial distribution on CXR (b)

Table 1. Summary in the F, S, and ML Groups

	Total	F (Cats)	S (Dogs <5kg)	ML (Dogs ≧5kg)
n	820	212	325	283
Sex	M 426 F 394	M 93, F 119	M 163, F 162	M 170, F 113
Age#	9 years (0.2–21years)	**10 years** (0.5–21years)	**9 years** (0.2–17 years)	**9 years** (0.3-16 years)
Body Weight#	4.4kg (1.1-61.2kg)	**4.1kg** (1.6-8.1kg)	**3.1kg** (1.1-4.9kg)	**8.3kg** (5.0-61.2kg)
Breed		Mix 128, American Shorthair 29, Russian blue 9	Yorkshire Terrier 84, Chihuahua 66, Pomeranian 55, Miniature Dachshund 29	French Bulldog 42, Miniature Dachshund 39, Pug 29, Labrador Retriever 24
Indication		**Abnormal CXR 152** Chronic cough 82 Chronic dyspnea 58	**Abnormal CXR 209** Chronic cough 148 Stridor 70	**Abnormal CXR 174** Stridor 98 Chronic cough 94
Type of Disease		Larynx 12 Large airway 5 Small airway+Lung 17	Larynx 20 Large airway 11 Small airway+Lung 17	Larynx 24 Large airway 10 Small airway+Lung 19
Position	Spine 754 Recumbency 62 Prone 4	**Spine 205** Recumbency 7 Prone 0	**Spine 300** Recumbency 21 Prone 4	**Spine 249** Recumbency 34 Prone 4
Time#	15 mins (0.2-377 mins)	**19 mins** * (0.2-371mins)	15 mins (0.4-377mins)	13 mins (1-263mins)

Median and range, * Statistically significant (P < 0.05)

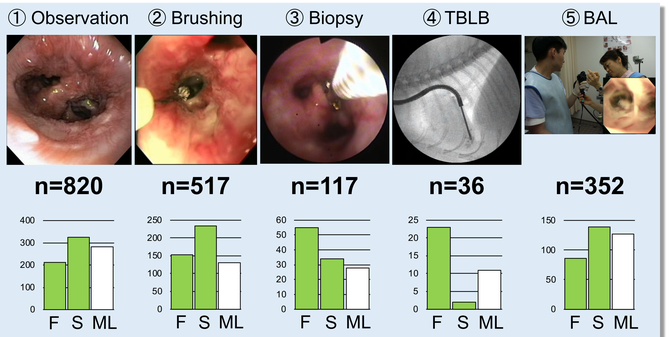

Fig 3. Endoscopic examination
The routine procedures used during LTBS–LMA were performed in the order that was needed. The histograms illustrate the procedure frequencies in each group. All procedures but TBLB were performed more frequently in the F and S Groups vs. the ML Group.
TBLB, transbronchial lung biopsy; BAL, bronchoalveolar lavage.

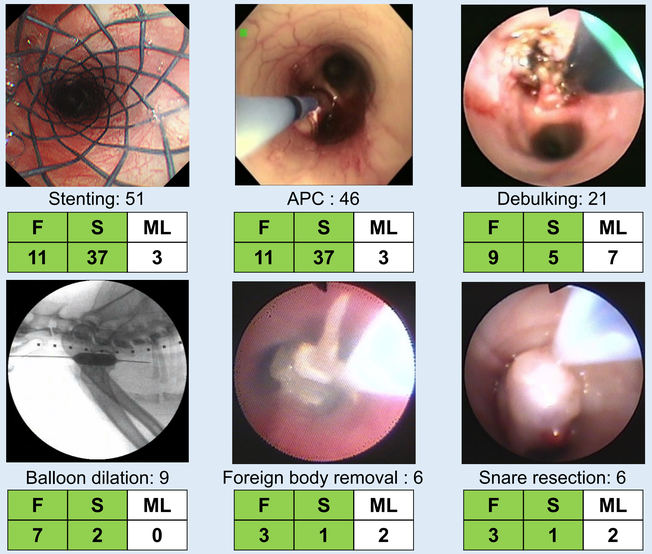

Fig 4. Endoscopic intervention
Types of endoscopic treatment performed during LTBS–LMA and frequencies in each group. Endoscopic interventions were performed more frequently in the F and S Groups vs. the ML Group. Stenting and APC were most often performed in the S Group.
APC, argon plasma coagulation.

Table 2. Major complications

	All LTBS–LMAs		n		
	Rate	n	F	S	ML
Atelectasis	0.2%	2	2	0	0
Pneumothorax	0.6%	5	4	0	1 *
Bleeding	1.3%	11	5	2	4
Spo_2<90% during procedures	6.0%	49	26	17	6 **
Apnea	0.2%	2	1	1	0
Tachypnea after LTBS–LMA	1.6%	13	6	5	2
Total	10.0%	82	44	25	13 *

* Significantly different among three groups P < 0.05, ** P < 0.01

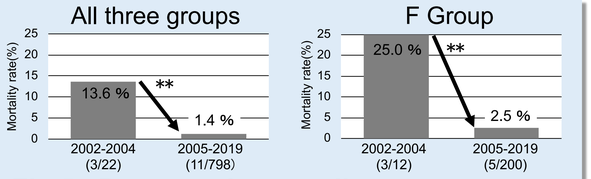

Fig 5. Decrease in mortality
The mortality rate decreased significantly (P < 0.01) after defining the candidate criterion of requiring a partial pressure of oxygen in arterial blood >60 mmHg in room air in 2005.

Conclusion

LTBS–LMA provided endoscopic examinations and interventions from the larynx to the lungs in cats and small dogs with comparable practicality and safety to those in medium and large dogs.

Acknowledgements

The VeRMS Study Group thanks late Dr. Nakakuki for providing the celluloid cast of canine tracheobronchial tree and Nihon University and AVS Co., LTD. for providing the 3D -printed tracheobronchial tree of canine model.

Conflict of Interest Disclosure

The primary presenter has nothing to disclose.

References

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