



The Effect of Desflurane vs. Sevoflurane on Perioperative Respiratory Complications in Laryngeal Mask Airway Anaesthesia: A Prospective Randomised Double-Blinded Controlled Trial

Prangmalee Leurcharusmee MD, Pathomporn Pin-On MD,
Suwannee Tanasungnuchit MD, Katekanog Srivita RN, Parichad Khunwittaya RN
Department of Anaesthesiology, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand, 50200

Introduction

- ❖ The pungent odor of desflurane (DES) has led to the controversy of its safety when it is used with laryngeal mask airway (LMA).
- ❖ A number of trials have been reported concerning benefits and side effects of using DES compared with sevoflurane (SEVO) during LMA anaesthesia^(1,2).
- ❖ Only a few were high-quality RCTs that used adverse respiratory responses as primary outcomes^(3,4).
- ❖ Anaesthetic techniques during induction, maintenance and emergence were not always well-described^(1,2).

Objective

- ❖ This is a non-inferiority patient-assessor blinded RCT designed to compare occurrences of respiratory complications between DES and SEVO during LMA anaesthesia.

Methods and Materials

- ❖ **ClinicalTrials.gov ID:** NCT03006250
- ❖ **Ethics approval:** 31/8/16
- ❖ **Recruitment:** 26/9/16-24/4/18

Inclusion criteria:

- ❖ 18-75 yr, BMI 18-30, ASA I-III
- ❖ Elective LMA anaesthesia

Exclusion criteria:

- ❖ URI within 1 month
- ❖ Heavy smoker (>20 cigs/day)
- ❖ Aspiration risk
- ❖ Muscle relaxant required

Primary outcome:

Adverse respiratory events

Secondary outcomes:

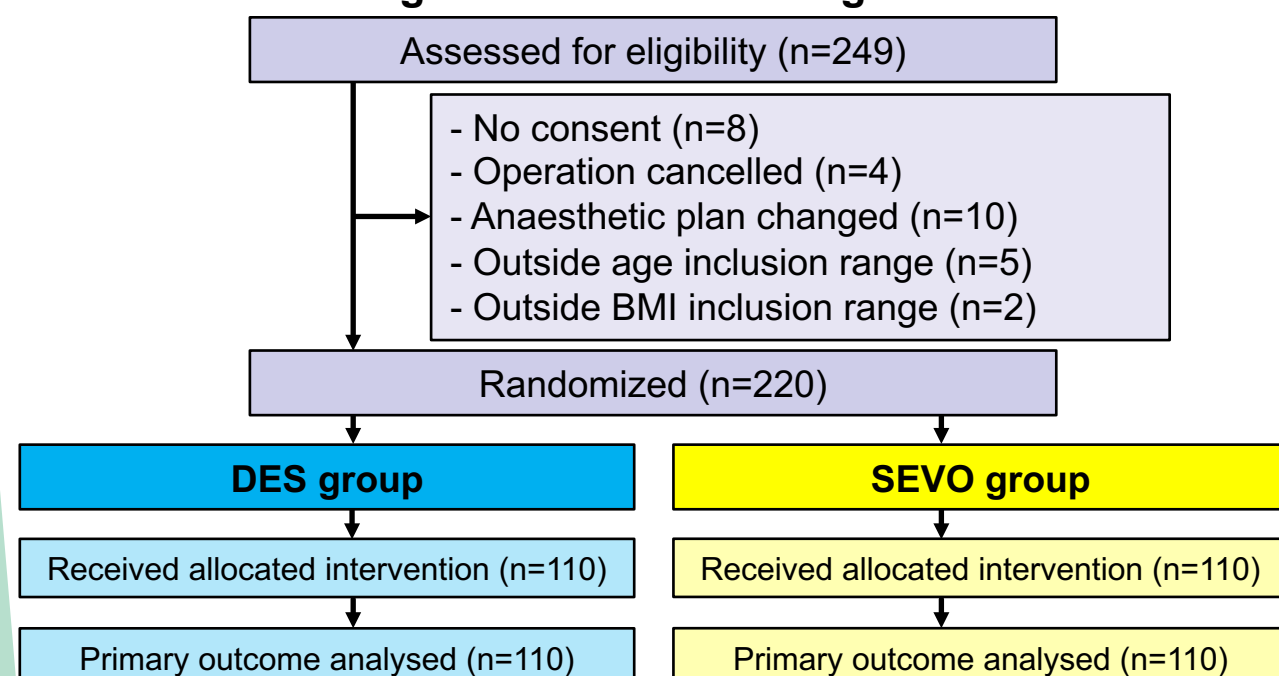
Time to and quality of recovery

- ❖ Standard monitoring
- ❖ Intravenous induction (propofol, fentanyl, lidocaine)
- ❖ LMA® Unique™ # 3.0-4.0
- ❖ DES or SEVO adjustment:

Dial setting (MAC)	O ₂ (LPM)	N ₂ O (LPM)	ET gas (MAC)
Wash-in			
2.0	1.0	1.0	0.3-0.5
Maintenance			
~1.0	0.5	0.5	0.5-1.0

- ❖ Pressure support ventilation
- ❖ LMA removal while awake

Figure 1: CONSORT diagram



Results

Table 1: Baseline data	DES	SEVO	p-value
Age (years)	44.7 ± 15.5	43.5 ± 15.9	0.545
Female	88.2%	84.5%	0.556
BMI (kg/m ²)	22.5 ± 3.4	23.0 ± 3.2	0.283
ASA I-II	99.1%	95.5%	0.212
Non-smoker	94.5%	95.5%	1.000
Operation time (minutes)	54.4 ± 31.8	54.4 ± 29.9	1.000

Figure 2: Occurrence of Respiratory Events

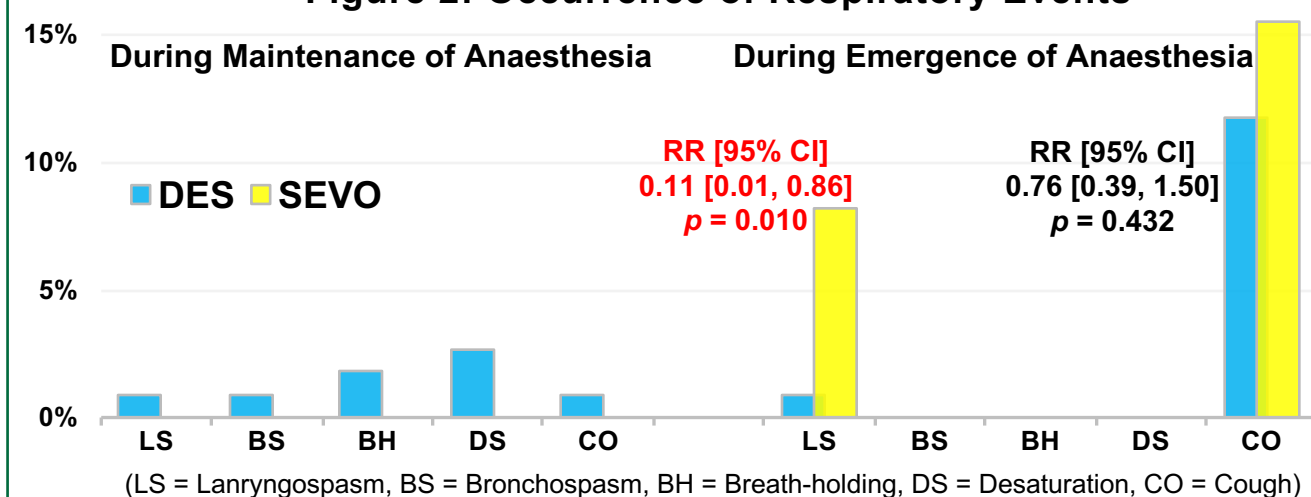


Table 2: Anaesthetic data	DES	SEVO	p-value
Induction data			
Propofol (mg/kg)	2.4 ± 0.5	2.5 ± 0.5	0.320
1-2 insertion attempt(s)	95.5%	94.5%	0.525
Intraoperative data			
Fentanyl (µg/kg)	0.3 ± 0.4	0.4 ± 0.4	0.571
Hypotension	25.5%	32.7%	0.235
Bradycardia (HR ≤ 50)	25.5%	20.0%	0.334
Postoperative data			
Nausea/vomit (PONV)	16.4%	9.1%	0.156
Good satisfaction	91.3%	91.7%	1.000

Table 3: Recovery profiles	DES	SEVO	p-value
Emergence times			
Time to eyes opening (minutes)	4.6 ± 1.8	5.7 ± 2.3	< 0.001
Time to hand grip (minutes)	4.8 ± 1.9	6.2 ± 2.4	< 0.001
Time to LMA removal (minutes)	5.0 ± 1.8	6.2 ± 2.1	< 0.001
Quality of recovery			
Orientation to time and place at 15 minutes	98.5%	94.3%	0.366
Bed-to-bed self-transfer ability at 15 minutes	88.7%	68.6%	0.004
Recovery times			
Modified Aldrete scores ≥ 9 at 30 minutes	85.5%	84.5%	0.850
Modified Aldrete scores ≥ 9 at 60 minutes	100.0%	100.0%	1.000

Discussion

- ❖ No serious respiratory incidence occurred. All cough events were self-limiting. Laryngospasm episodes were recovered by CPAP.
- ❖ Airway events during maintenance were related to technical errors including LMA displacement and anesthetic circuit disconnection.
- ❖ Slower LMA removal time induced cough at emergence in SEVO.
- ❖ DES was identified as an independent risk factor for PONV⁽⁵⁾.
- ❖ Comparison with other trials was limited due to differing protocols.

Conclusion

- ❖ DES is possibly superior to SEVO even with LMA removal during the awake state when its pungent odor is a factor.
- ❖ DES group showed significantly greater recovery profiles with fewer adverse respiratory events during the emergence period.

- References:** 1) Stevanovic A, et al. Airway reactions and emergence times in general laryngeal mask airway anaesthesia: a meta-analysis. Eur J Anaesthesiol. 2015;32:106-16.
2) de Oliveira GS, et al. The effect of sevoflurane versus desflurane on the incidence of upper respiratory morbidity in patients undergoing general anesthesia with a laryngeal mask airway: a meta-analysis of randomized controlled trials. J Clin Anesth. 2013;25:452-8.
3) Eshima RW, et al. A comparison of airway responses during desflurane and sevoflurane administration via a laryngeal mask airway for maintenance of anesthesia. Anesth Analg. 2003;96:701-5.
4) Lema FE, et al. [Incidence of cough after desflurane and sevoflurane administration through a laryngeal mask: a controlled clinical trial]. Rev Esp Anestesiol Reanim. 2010;57:141-6.
5) Choi JB, et al. Incidence and risk factors of postoperative nausea and vomiting in patients with fentanyl-based intravenous patient-controlled analgesia and single antiemetic prophylaxis. Yonsei Med J. 2014;55:1430-5.