

COMPARISON OF HEMODYNAMIC RESPONSE TO EXTUBATION USING THE LMA SUPREME (BAILEY MANEUVER) VERSUS STANDARD TRACHEAL EXTUBATION IN ELDERLY PATIENTS: A RANDOMIZED CONTROLLED TRIAL

Surya Tej P. V.¹, Divya K Anand², Natarajan M.², Gautam Prem³, Himmat Singh Pannu³

Received : 26/08/2026
Received in revised form : 22/09/2026
Accepted : 05/10/2026

Keywords:

Bailey manoeuvre; LMA Supreme; extubation; haemodynamic response; elderly; supraglottic airway device.

Corresponding Author:

Dr. Surya Tej P V,

Email: paluri.suryatej96@gmail.com

DOI: 10.47009/jamp.2026.8.5.155

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2026; 8 (5); 982-989



¹Senior Resident, Department of Neuroanaesthesia, Christian Medical College (CMC), Vellore, Tamil Nadu, India.

²Consultant Anaesthesiologist, Rajagiri Hospital, Aluva, Ernakulam, Kerala, India.

²Assistant Professor, Department of Anaesthesiology, K.A.P.V. Government Medical College, Trichy, Tamil Nadu, India.

³Senior Resident, Department of Pulmonology, Christian Medical College (CMC), Vellore, Tamil Nadu, India.

³Senior Resident, Dr. Baba Saheb Ambedkar Medical College and Hospital, Delhi, India.

ABSTRACT

Background: Tracheal extubation commonly provokes sympathoadrenal activation (tachycardia, hypertension) and airway reflexes which are hazardous in elderly patients. The Bailey manoeuvre (exchange of endotracheal tube for a supraglottic airway under deep anaesthesia) with a second-generation LMA (LMA Supreme) may attenuate these responses. **Materials and Methods:** Conducted as a prospective, randomised, single-blinded trial of 110 patients ≥ 60 years (ASA I–II) undergoing elective surgery. Patients allocated to Group A (standard tracheal extubation, $n = 55$) or Group B (LMA exchange, $n = 55$). Heart rate, systolic and diastolic blood pressure, mean arterial pressure, rate pressure product, SpO₂, respiratory rate was recorded at baseline, pre-extubation, and 1, 3, 5 and 10 minutes post-extubation. Complications, LMA insertion characteristics and extubation quality were recorded. **Results:** Baseline demographics were comparable. Group B demonstrated significantly lower HR, SBP, DBP, MAP and RPP from pre-extubation through 5 minutes post-extubation (all $p < 0.001$). RPP in Group A exceeded 12,000 (a myocardial ischaemia risk threshold) from pre-extubation to 5 minutes, while Group B remained below it. Bucking occurred less often in Group B (9.1% vs 23.6%; $p = 0.039$). LMA Supreme insertion: mean 27.0 ± 4.3 s; first-attempt success 85.5%. No episodes of aspiration, laryngospasm, re-intubation or need for ventilatory support occurred in any of the study groups. **Conclusion:** The Bailey manoeuvre using the LMA Supreme markedly attenuates peri-extubation haemodynamic stress and reduces immediate respiratory complications in elderly patients, without compromising oxygenation.

INTRODUCTION

The anatomical basis for both the extubation response and supraglottic airway function lies in the structures of the upper airway and their sensory innervation. The innervation is mainly by the branches of vagus nerve. Mechanoreceptors in the laryngo-tracheal mucosa transmit powerful afferent signals that trigger sympathetic discharge and airway reflexes when stimulated by an endotracheal tube. Supraglottic devices (such as the LMA Supreme) sit above the glottis and therefore exert far less direct pressure on

these mechanoreceptors; their mask seals the pyriform fossae and piriform recess margins and rests against the periglottic tissues, allowing ventilation with reduced laryngeal stimulation while a gastric drain channel routes regurgitant material away from the laryngeal inlet.^[1]

Tracheal extubation is an important phase of anaesthetic care that provokes reflex sympathetic activation and airway reflexes via laryngo-tracheal mechanoreceptor stimulation. In elderly patients with reduced cardiovascular reserve, transient tachycardia and hypertension at extubation can precipitate

myocardial ischaemia, arrhythmias, or cerebrovascular events.^[2,3] Strategies to blunt the extubation response include pharmacological agents (e.g., labetalol, GTN, Esmolol, etc) and anaesthetic technique modifications (e.g., deep extubation, airway exchange catheter) but each has limitations.^[4] The Bailey manoeuvre is one such technique which reduces airway stimulation during emergence. It involves exchange of ETT for a supraglottic airway under deep anaesthesia. Supraglottic airway devices (SADs) are periglottic airway adjuncts placed above the vocal cords to maintain patency and allow effective ventilation and oxygenation. They have transformed airway management by providing a rapid, less invasive alternative to endotracheal intubation, particularly useful when intubation is difficult or time critical. The LMA Supreme, a second-generation SAD with gastric drain and improved seal, may offer additional safety.^[5] In view of this we have conducted a prospective randomised trial comparing the LMA Supreme Bailey manoeuvre with standard awake extubation in elderly patients undergoing elective surgeries.

Aim and Objectives

The aim of the study was to compare the haemodynamic attenuation response following extubation using LMA supreme (Bailey Manoeuvre) versus standard extubation.

The primary objective of the study was to determine and compare the changes in Heart Rate(HR), Systolic Blood Pressure (SBP), Diastolic Blood Pressure(DBP), Mean Arterial Pressure (MAP), Rate pressure product (RPP) and Incidence of complications following extubation using bailey manoeuvre with LMA supreme versus standard traditional extubation technique.

The Secondary objectives were to evaluate the number of attempts taken to insert the device and the time taken to insert the airway device.

MATERIALS AND METHODS

Design and setting: This was conducted as a prospective, randomised, single-blinded, parallel-group trial at K.A.P.V. Government Medical College and Mahatma Gandhi Memorial Government Hospital from January 2023 to May 2024. Institutional ethics approval (KAPV/IEC/230215821) was obtained prior to starting the study and written informed consent obtained was from every participant. Manuscript has been prepared in accordance with CONSORT guidelines

Figure 1: Consort Diagram of patient allocation into groups

The patients enrolled into the study were enrolled on the basis of the following inclusion and exclusion criteria

Inclusion Criteria

- ASA 1 and 2
- Age more than 60 years

- BMI< 35kg/m²
- Posted for elective surgery under general anaesthesia
- Patients giving valid consent

Exclusion Criteria

- Anticipated difficult airway
- Active respiratory tract infection
- BMI > 35kg/m²
- Known case of COPD or any respiratory disorders
- Posted for emergency surgeries
- Refusal of consent

This study was conducted as a single-blinded, parallel-group randomised controlled trial. Randomisation for allocation of the participants to the study arms was by Sealed-envelope method with Group A (standard extubation) or Group B (ETT→LMA Supreme exchange). The random allocation sequence was generated by an investigator not involved in patient recruitment. Eligible participants were enrolled by the principal investigator. Allocation was implemented using sequentially numbered opaque sealed envelopes opened immediately before intervention by the attending anaesthesiologist. Participants were blinded to group allocation throughout the study. Owing to the nature of the intervention, the attending anaesthesiologist performing the airway management and LMA Supreme exchange could not be blinded. To minimise observer bias, all haemodynamic measurements, respiratory parameters, extubation quality, and peri-extubation complications were recorded by an independent observer who was blinded to the treatment allocation. Statistical analysis was performed using anonymized group-coded data.

Sample size: Using data from reference articles and considering mean HR difference and with 80% power, alpha error of 0.05 and a 95% confidence interval, sample size was calculated using the formula $(N=2\sigma^2(Z\beta+Z\alpha/2)^2/(\text{Difference in means})^2)$. The minimum sample size needed was 97.83 patients. Accounting for the attrition rate we zeroed the sample size to 110 patients with 55 patients per study arm were enrolled.^[6,7]

Anaesthetic protocol: Standard institution protocol was followed for all the patients in both arms of the study, which involved premedication glycopyrrolate 10 µg/kg, midazolam 50 µg/kg IV. Induction with Propofol 2 mg/kg and fentanyl 2 µg/kg; vecuronium 0.1 mg/kg for neuromuscular blockade. Maintenance with oxygen/air and sevoflurane 1% and vecuronium 0.02mg/kg every 45 mins. 15 mins prior to completion of the surgery the randomisation envelopes are opened the anaesthesiologist on the case to do the further procedures as per the study arm assigned as per the protocols. Patients who were randomised into group A followed the following protocol Group A (standard extubation): Sevoflurane was discontinued 5 minutes before completion of surgery, followed by oropharyngeal suctioning. After

return of adequate spontaneous breathing, neuromuscular blockade was reversed with neostigmine 50 µg/kg and glycopyrrolate 10 µg/kg, and patients were extubated awake; IV lignocaine 1.5 mg/kg was given 90 seconds before extubation and the ETT was removed at near vital capacity with gentle positive pressure. Patients received 100% oxygen post-extubation, and haemodynamics were recorded pre-extubation and at 1, 3, 5 and 10 minutes along with airway events and extubation quality. Patients who were randomised into Group B (Bailey manoeuvre/LMA exchange): Approximately 15 minutes before the end of surgery (or after pneumoperitoneum deflation), a deep plane of anaesthesia was maintained (with vecuronium supplementation if required), the ETT was removed after suctioning, and an appropriately sized LMA Supreme was inserted; cuff pressure was adjusted with a manometer and position confirmed by bilateral air entry and capnography,^[8,9] with ventilation continued via the LMA until the end of surgery. Sevoflurane was stopped 5 minutes before completion, reversal was performed with neostigmine 50 µg/kg and glycopyrrolate 10 µg/kg, IV lignocaine 1.5 mg/kg was administered 90 seconds before removal,^[10] and the LMA was removed at near vital capacity with positive pressure, followed by 100% oxygen and standard monitoring. Outcomes: Primary outcomes were HR, SBP, DBP, MAP, and RPP measured at baseline, pre-extubation, and 1, 3, 5, 10 minutes post-extubation. Secondary outcomes were SpO₂, RR, incidence of coughing/bucking/laryngospasm/desaturation, dysrhythmia, LMA insertion time/attempts, and extubation quality.

RESULTS

The data analysis was performed by SPSS Version 26 software. Continuous variables were expressed as mean (standard deviation, SD) to summarize central tendency and variability, while categorical variables were presented as numbers and percentages. Categorical variables were analysed using the chi-square test, while Fisher's exact test was used for cases with low expected cell frequencies (typically <5). Comparisons of continuous variables between groups (LMA Supreme vs. endotracheal tube) were conducted using an independent t-test. A p-value of less than 0.05 was considered statistically significant. The mean time for LMA insertion was 27 seconds, measured from the time the device was picked up to the appearance of a square capnography waveform. Notably, none of the 110 cases experienced LMA insertion failure, severe respiratory distress, laryngospasm, or required re-intubation or ventilatory support post-extubation, indicating a

favourable safety profile for the LMA Supreme in this elderly patient population.

These statistical analyses provided a rigorous comparison of haemodynamic stability and safety outcomes between the two airway devices, offering insights relevant to elderly patients undergoing elective surgeries.

Below are the pie charts showing the distribution of cases among the ETT and the LMA groups respectively.

Figure 2: Pie charts show the distribution cases among both the arms of the study with major chunk being in neurosurgeries in both arms.

Baseline characteristics Groups were comparable for demographics and baseline airway/clinical variables Table 1: Baseline demographic and clinical characteristics (Values are mean ± SD or n (%))

Haemodynamic parameters HR (Heart Rate), SBP (Systolic Blood Pressure), DBP (Diastolic Blood Pressure), MAP (Mean Arterial Pressure), RPP (Rate Pressure Product) were monitored at baseline levels, pre extubation, 1 min post extubation, 3 min post extubation, 5 min post extubation and 10 minutes post extubation,

Table 2: Haemodynamic parameters i.e. parameters HR (Heart Rate), SBP (Systolic Blood Pressure), DBP (Diastolic Blood Pressure), MAP (Mean Arterial Pressure), RPP (Rate Pressure Product) at all time points

*Bolded values indicate Group B significantly lower than Group A; * p < 0.05 is significant

Figure 3: Heart rate trend and Rate pressure product trend over prespecified time intervals for both groups.

Respiratory parameters SpO₂ and RR remained comparable and clinically acceptable in both groups across all time intervals. No patient experienced SpO₂ < 94% requiring intervention.

LMA insertion characteristics and LMA performance.

Table 3: LMA Supreme insertion and performance characteristics (Group B, n = 55)

Extubation quality was graded into 5 classes ranging from no cough to laryngospasm.^[11,12]

Extubation Quality grade: Grading done based on the following scale

- Grade1: Patient is having no cough
- Grade 2: Smooth Extubation, Minimal Coughing (one or two times)
- Grade 3: Moderate coughing - three or four times
- Grade 4: Severe coughing - five to ten times and straining
- Grade 5: Poor Extubation, very uncomfortable (laryngospasm and coughing) more than ten times
- Table 4: Extubation quality grading between both groups

Table 1: Baseline demographic and clinical characteristics (Values are mean ± SD or n (%))

Variable	Group A (ETT) n = 55	Group B (LMA) n = 55	p-value
Age (years)	65.8 ± 4.4	66.8 ± 3.8	0.240
Male n (%)	36 (65.5%)	36 (65.5%)	1.000
Female n (%)	19(34.5%)	19(34.5%)	1.000
Height (cm)	159.0 ± 11.1	162.6 ± 11.3	0.089
Weight (kg)	60.4 ± 6.7	63.2 ± 8.5	0.057
BMI (kg/m ²)	24.4 ± 4.6	23.9 ± 2.4	0.528
Mallampati class	1.9 ± 0.82	2.1 ± 0.81	0.417

Table 2: Haemodynamic parameters i.e. parameters HR (Heart Rate), SBP (Systolic Blood Pressure), DBP (Diastolic Blood Pressure), MAP (Mean Arterial Pressure), RPP (Rate Pressure Product) at all time points

Time	Group	HR (bpm)	SBP (mmHg)	DBP (mmHg)	MAP (mmHg)	RPP
Pre-op	A (ETT)	84.7 (82.7–86.7)	128.4 (125.7–131.1)	79.2 (77.0–81.4)	95.6 (93.3–97.9)	10,884 (10,625–11,143)
	B (LMA)	83.1 (81.4–84.8)	126.9 (124.3–129.5)	78.6 (76.2–81.0)	94.7 (92.3–97.1)	10,538 (10,289–10,787)
	Cohen's d	0.04	0.33	0.27	0.34	0.33
	p value	0.834	0.086	0.159	0.077	0.086
Pre extubation	A (ETT)	113.2 (111.1–115.3)	146.6 (144.3–148.9)	89.9 (88.5–91.3)	108.6 (104.5–112.7)	16,574 (16,214–16,934)
	B (LMA)	96.1 (94.5–97.7)	125.6 (123.1–128.1)	76.6 (73.8–79.4)	92.7 (90.3–95.1)	12,083 (11,812–12,354)
	Cohen's d	2.40 (1.91, 2.89)	2.29 (1.81, 2.77)	1.58 (1.16, 2.00)	1.26 (0.86, 1.66)	2.29 (1.81, 2.77)
	p value	<0.001	<0.001	<0.001	<0.001	<0.001
Post extubation-1 min	A (ETT)	118.5 (115.8–121.2)	152.3 (149.8–154.8)	93.2 (91.6–94.8)	112.1 (108.3–115.9)	18,054 (17,661–18,447)
	B (LMA)	97.8 (95.6–100.0)	127.4 (125.1–129.7)	77.3 (74.8–79.8)	94.2 (91.9–96.5)	12,466 (12,173–12,759)
	Cohen's d	2.20 (1.73, 2.67)	2.37 (1.88, 2.86)	1.42 (1.01, 1.83)	2.35 (1.86, 2.84)	2.37 (1.88, 2.86)
	p value	<0.001	<0.001	<0.001	<0.001	<0.001
Post extubation-3 min	A (ETT)	110.3 (107.9–112.7)	146.8 (144.6–149.0)	90.1 (88.4–91.8)	105.6 (102.2–109.0)	16,197 (15,833–16,561)
	B (LMA)	95.4 (93.4–97.4)	126.1 (123.9–128.3)	78.1 (75.7–80.5)	93.1 (91.0–95.2)	12,049 (11,768–12,330)
	Cohen's d	1.61 (1.19, 2.03)	0.87 (0.49, 1.25)	1.23 (0.83, 1.63)	1.57 (1.15, 1.99)	0.87 (0.49, 1.25)
	p value	<0.001	<0.001	<0.001	<0.001	<0.001
Post extubation-5 min	A (ETT)	102.6 (100.4–104.8)	138.2 (136.1–140.3)	85.4 (83.8–87.0)	99.4 (96.4–102.4)	14,183 (13,862–14,504)
	B (LMA)	91.8 (90.0–93.6)	124.3 (122.2–126.4)	76.9 (74.7–79.1)	91.3 (89.2–93.4)	11,416 (11,158–11,674)
	Cohen's d	0.97 (0.58, 1.36)	0.90 (0.51, 1.29)	1.17 (0.77, 1.57)	1.61 (1.19, 2.03)	0.90 (0.51, 1.29)
	p value	<0.001	<0.001	<0.001	<0.001	<0.001
Post extubation-10 min	A (ETT)	90.3 (88.4–92.2)	132.1 (130.1–134.1)	81.3 (79.7–82.9)	94.9 (92.7–97.1)	11,939 (11,669–12,209)
	B (LMA)	87.5 (85.9–89.1)	129.8 (127.9–131.7)	79.1 (77.1–81.1)	92.7 (90.7–94.7)	11,373 (11,131–11,615)
	Cohen's d	0.47 (0.09, 0.85)	0.69 (0.31, 1.07)	0.34 (–0.04, 0.72)	0.80 (0.42, 1.18)	0.69 (0.31, 1.07)
	p value	0.015	<0.001	0.077	<0.001	<0.001

Table 3: LMA Supreme insertion and performance characteristics (Group B, n = 55)

Parameter	Value
Mean insertion time, seconds (mean ± SD)	27.0 ± 4.3
First attempt success, n (%)	47 (85.5%)
Second attempt, n (%)	7 (12.7%)
Third attempt, n (%)	1 (1.8%)
Failed insertion, n (%)	0 (0.0%)
Easy insertion, n (%)	47 (85.5%)
Difficult insertion, n (%)	8 (14.5%)

Table 4: Extubation quality grading between both groups

Parameter	Group A ETT	Group B LMA	P value
Extubation quality — Grade 1 (no cough)	27 (49.1%)	43 (78.2%)	< 0.001
Extubation quality — Grade 2 (minimal cough)	13 (23.6%)	7 (12.7%)	
Extubation quality — Grade 3 (moderate)	10 (18.2%)	4 (7.3%)	
Extubation quality Grade 4 (severe coughing/straining)	5(9.1%)	1(1.8%)	
Extubation quality Grade 5 (Laryngospasm)	0(0%)	0(0%)	

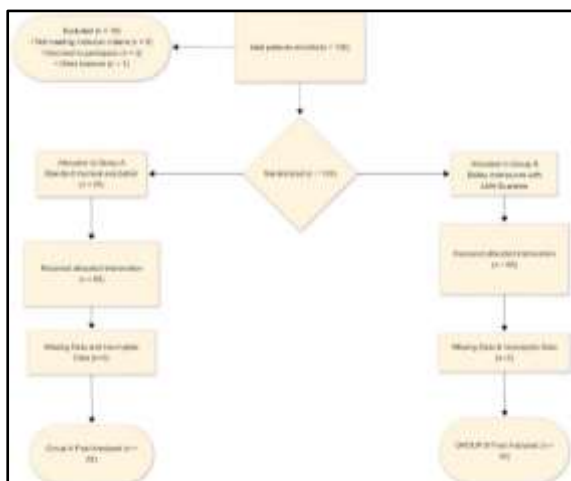


Figure 1: Consort Diagram of patient allocation into groups

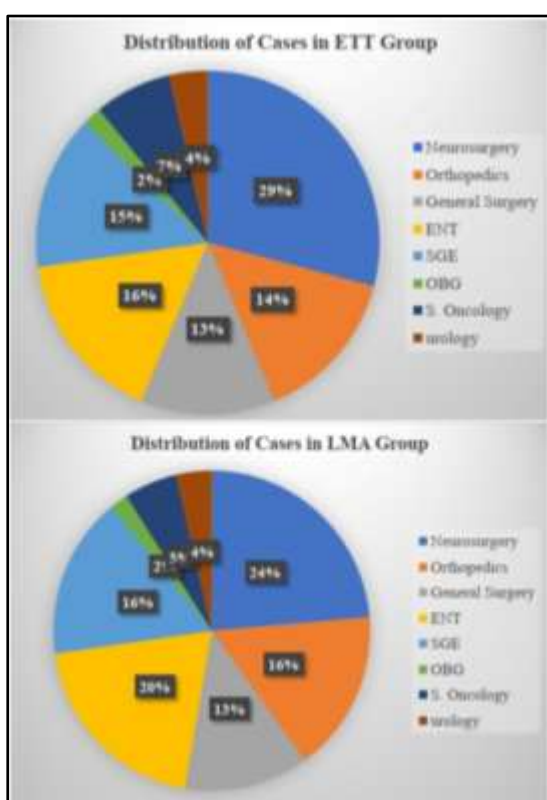


Figure 2: Pie charts show the distribution cases among both the arms of the study with major chunk being in neurosurgeries in both arms

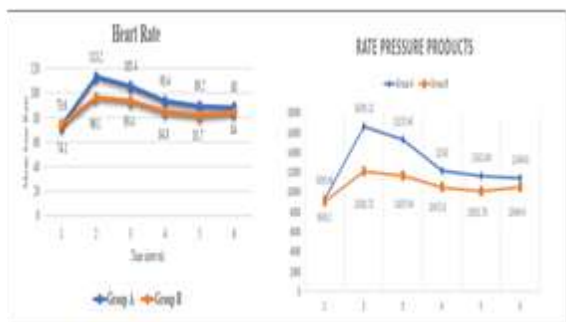


Figure 3: Heart rate trend and Rate pressure product trend over prespecified time intervals for both groups



Figure 1-3: these depict the insertion and fixation of LMA supreme



Figure 4-5: These figures depict the measurement of cuff pressure of the inserted LMA supreme

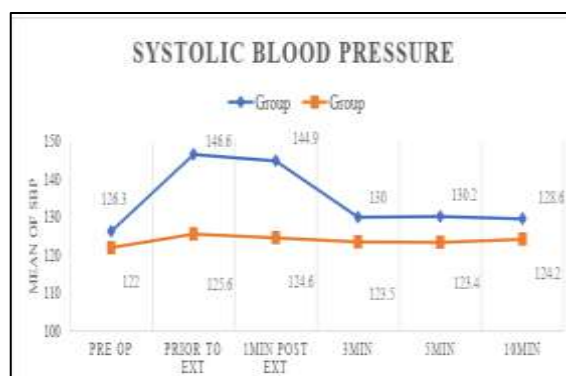


Figure 6: Systolic blood pressure trend graph over time for both groups

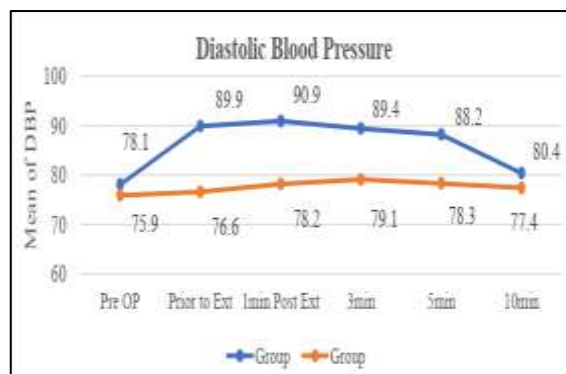


Figure 7: Diastolic Blood Pressure (DBP) trend graph over time for both groups

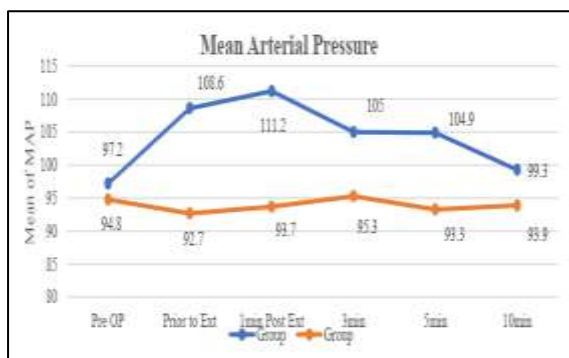


Figure 8: Mean arterial blood pressure trend over time for both groups

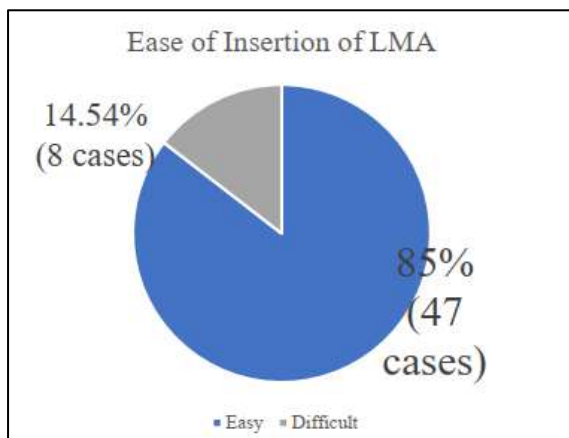


Figure 9: Pie chart depicting the ease of insertion of LMA in the LMA exchange group

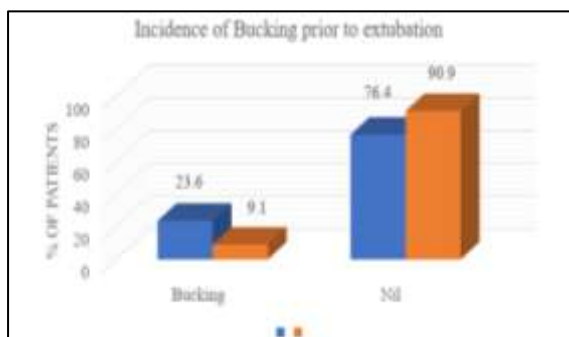


Figure 10: This bar chart shows us the incidence of bucking between the groups and difference of incidence which is statistically significant

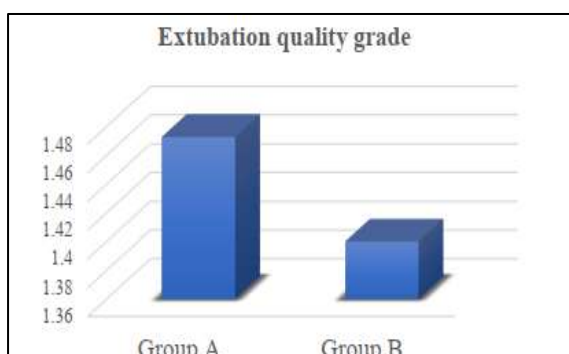


Figure 11: The bar chart depicts the overall extubation quality grade among both the groups in the study

DISCUSSION

This randomised controlled trial shows that replacing the endotracheal tube with the LMA Supreme under a deep plane of anaesthesia (Bailey manoeuvre) produces consistent and clinically meaningful attenuation of peri-extubation haemodynamic responses in elderly elective surgical patients. Heart rate, systolic and diastolic blood pressure, mean arterial pressure and rate pressure product were all significantly lower in the LMA group from pre-extubation through 5 minutes after extubation, though the values converged toward baseline by 10 minutes.

Physiological rationale Removing the ETT while the patient remains in a deep plane of anaesthesia eliminates the principal mechanical stimulus to laryngo-tracheal mechanoreceptors at the critical moment when sympathetic tone would otherwise rebound. These mechanisms are consistent with contemporary evidence that endotracheal intubation produces significantly greater pressor responses than supraglottic airway placement.^[13] The supraglottic position of the LMA Supreme applies far less focal pressure to the laryngotracheal mucosa than a cuffed ETT, thereby reducing afferent drive and catecholamine release during emergence. These mechanisms explain the observed reductions in HR and arterial pressure in Group B and are consistent with classic studies of airway reflexes and pressor responses.^{[14],[15]}

RPP (Rate Pressure product) is the product of Heart rate and Systolic Blood Pressure ($HR \times SBP$) is a validated surrogate of myocardial oxygen demand along with myocardial event risk.^[16] Group A exceeded commonly cited RPP thresholds ($>12,000$) from pre-extubation through 5 minutes post-extubation, whereas Group B remained below this threshold at all measured time points. Recent studies have reaffirmed the prognostic value of RPP in cardiac populations: Jiang et al. demonstrated that elevated RPP is an independent predictor of long-term adverse outcomes following percutaneous coronary intervention,^[17] while Liu et al. showed that $RPP > 10.8$ predicts both in-hospital cardiac and long-term all-cause mortality in patients with acute coronary syndrome.^[18] In elderly patients with a higher prevalence of occult coronary disease, lowering peri-extubation RPP is clinically relevant and may reduce myocardial ischaemic risk; however, demonstrating reductions in hard cardiac outcomes requires larger trials with extended follow-up.

Comparison with prior literature Our findings align with previous reports showing less haemodynamic disturbance with LMA removal or SAD-facilitated emergence versus tracheal extubation.^[6,7,19] The present study extends prior work by focusing exclusively on an elderly population and by emphasising RPP as a clinically meaningful endpoint. A recent RCT by Tiwari et al. comparing the Bailey manoeuvre with conventional awake

extubation reported similar attenuation of heart rate and blood pressure response.^[13] Furthermore, Thalagunda et al. demonstrated that the Ambu AuraGain, another second-generation SAD, significantly reduced extubation-related haemodynamic perturbations and coughing compared with standard tracheal extubation.^[20]

A 2025 systematic review and meta-analysis by Carvalho et al. synthesised 51 randomised controlled trials (5,110 patients) comparing second-generation SGAs with endotracheal intubation in adults undergoing abdominopelvic surgery.^[21] The analysis demonstrated that SGAs reduced major airway complications by 59% (relative risk 0.41, 95% CI 0.20–0.82), with significant reductions in sore throat, hoarseness, and coughing at emergence. These findings provide high-level evidence supporting the safety profile observed in our study, where no aspiration, laryngospasm, or re-intubation events occurred.

Airway safety and oxygenation A common concern about SAD use during emergence is airway protection and aspiration risk. The LMA Supreme's gastric drain channel and higher oropharyngeal seal mitigate aspiration concerns and facilitate ventilation.^[22,23] In our study no aspiration, laryngospasm, re-intubation or clinically important desaturation events occurred in either group; SpO₂ and RR were comparable throughout. Cuff pressure management is critical to SAD safety: Seet et al. demonstrated that limiting cuff pressure to 25 cm H₂O with manometry significantly reduced postoperative pharyngolaryngeal adverse events compared with routine care,^[9] and a subsequent trial confirmed that higher cuff pressures are associated with increased morbidity.^[24] These results support the safety of the Bailey manoeuvre in elective, fasted elderly patients with appropriate selection of size.

With respect to performance of LMA supreme, the mean insertion time (27.0 ± 4.3 s) and first-attempt success (85.5%) indicate that the LMA Supreme is readily deployable as an airway exchange device when users are appropriately trained. Most insertions were performed by supervised trainees, suggesting the manoeuvre is teachable and implementable in routine practice with training and protocols for cuff pressure management.

The neurosurgical relevance of the Bailey manoeuvre deserves particular emphasis. In our cohort, neurosurgery constituted the largest surgical subgroup in both arms. Tracheal extubation in craniotomy patients is associated with unique risks: coughing and straining can precipitate acute intracranial hypertension, impair cerebral autoregulation, and threaten the integrity of the tumour resection bed with catastrophic haemorrhage.^[25] Wei et al., in a prospective RCT of craniotomy patients, demonstrated that LMA-facilitated emergence produced significantly better oxygenation (PaO₂ 264.4 ± 85.4 vs 188.9 ± 71.1 mmHg), fewer respiratory complications, and reduced airway interventions compared with deep

extubation alone.^[26] Contemporary narrative reviews on supraglottic airway devices in neuroanaesthesia explicitly identify the Bailey manoeuvre as a strategy that "serves a significant function in blunting extubation responses, thereby preventing cerebral edema and tumour bed haemorrhage."^[25] The LMA Supreme's gastric drainage channel and high oropharyngeal seal pressure provide an additional safety margin in the semirecumbent or lateral positions frequently employed in neurosurgery.^[22] For elderly patients with reduced cerebral compliance and occult cardiovascular disease, the combination of haemodynamic attenuation and preserved oxygenation makes the Bailey manoeuvre with a second-generation SAD an attractive extubation strategy following intracranial procedures.

This study being single-centre study may limit external generalisability. Blinding of the anaesthetist performing the airway exchange was not possible, though outcome assessors were blinded to allocation to mitigate observer bias. Haemodynamic monitoring was limited to non-invasive measures; invasive arterial monitoring, ECG surveillance, or perioperative cardiac biomarkers would strengthen assessment of myocardial impact. All patients received IV lignocaine before extubation per institutional practice; lignocaine may have partially attenuated extubation responses in both groups, potentially reducing the measured inter-group difference.^[10] The study did not capture longer-term clinical endpoints (30-day MACE, ICU admissions, length of stay), which require larger multicentre trials.

For selected elderly patients who are fasted and at moderate aspiration risk, the Bailey manoeuvre with a second-generation SAD such as the LMA Supreme is a practical strategy to blunt peri-extubation haemodynamic stress and to reduce coughing and bucking. This technique is particularly useful where sudden straining is undesirable (neurosurgery, ENT, ophthalmic procedures) or in patients with limited cardiac reserve. Exchanging the ETT for the LMA Supreme under deep anaesthesia (Bailey manoeuvre) produced marked attenuation of heart rate, blood pressure and rate pressure product during emergence in elderly patients, improved extubation quality and reduced bucking and coughing without compromising oxygenation. The technique is safe and reproducible in selected patients and merits consideration as an extubation strategy in elderly surgical populations. Larger trials are warranted to evaluate whether these haemodynamic improvements translate into reduced perioperative cardiac events.

CONCLUSION

Funding: No specific grant from any funding agency in the public, commercial, or not-for-profit sectors was obtained for the study.

Conflict of Interest: The authors declare no conflicts of interest related to this manuscript.

REFERENCES

1. Yu SH, Beirne OR. Laryngeal mask airways have a lower risk of airway complications compared with endotracheal intubation: a systematic review. *J Oral Maxillofac Surg.* 2010;68:2359–2376.
2. Gao L, Chen L, He J, Wang B, Liu C, Wang R, et al. Perioperative Myocardial Injury/Infarction After Non-cardiac Surgery in Elderly Patients. *Front. Cardiovasc. Med.* 2022;9:910879.
3. Jin F, Chung FM. Minimizing perioperative adverse events in the elderly. *Br J Anaesth.* 2001;87:608–624.
4. Cavallone LF, Vannucci AE. Extubation of the difficult airway and extubation failure. *Anesth Analg.* 2013;116:368–383.
5. Brain AJ, Verghese C, Strube PJ. The LMA Supreme — a new single-use laryngeal mask airway with an oesophageal vent. *Br J Anaesth.* 2007;99:404–408.
6. Mishra SK, Bhardwaj N, Sharma RB. LMA as an airway exchanger during reversal of anaesthesia. *Indian J Anaesth.* 2011;55:167–170.
7. Sharma B, Sood J, Sahai C, Kumra VP. Challenging endotracheal extubation: a new look at the Bailey manoeuvre. *J Anaesth Clin Pharmacol.* 2008;24:293–297.
8. Bhavani-Shankar K, Moseley H, Kumar AY, Delph Y. Capnometry and anaesthesia. *Can J Anaesth.* 1992;39:617–632.
9. Seet E, Yousaf F, Gupta S, Subramanyam R, Wong DT, Chung F. Use of manometry for laryngeal mask airway reduces postoperative pharyngolaryngeal adverse events: a prospective, randomised trial. *Anesthesiology.* 2010;112:652–657.
10. Lam F, Lin YC, Tsai HC, Chen TL, Tam KW, Chen CY. Effect of intracuff lidocaine on endotracheal-tube-induced emergence phenomena after general anaesthesia: a systematic review and meta-analysis of randomised controlled trials. *J Clin Anesth.* 2015;27:230–239.
11. International Journal of Medical Science and Current Research (IJMSCR) 2021;4:
12. Minogue SC, Ralph J, Lampa MJ. Laryngotracheal Topicalization with Lidocaine Before Intubation Decreases the Incidence of Coughing on Emergence from General Anaesthesia. *Anesth. Analg.* 2004;99:1253–1257.
13. Tiwari R, Gupta S, Youvaraj M. Comparative evaluation of Bailey manoeuvre of deep extubation with conventional awake extubation technique — A randomised clinical study. *Asian J Med Sci.* 2024;15:58–63.
14. Lowrie A, Johnston PL, Fell D, Robinson SL. Cardiovascular and plasma catecholamine responses at tracheal extubation. *Br J Anaesth.* 1992;68:261–263.
15. Shribman AJ, Smith G, Achola KJ. Cardiovascular and catecholamine responses to laryngoscopy with and without tracheal intubation. *Br J Anaesth.* 1987;59:295–299.
16. Robinson BF. Relation of heart rate and systolic blood pressure to the onset of pain in angina pectoris. *Circulation.* 1967;35:1073–1083.
17. Jiang ZH, Aierken A, Wu TT, Zheng YY, Ma YT, Xie X. Rate pressure product as a novel predictor of long-term adverse outcomes in patients after percutaneous coronary intervention: a retrospective cohort study. *BMJ Open.* 2023;13:e067951.
18. Liu Z, others. Rate-pressure product is a novel predictor for short- and long-term mortality in patients with acute coronary syndrome undergoing primary PCI/immediate invasive strategy. *Cardiovasc Ther.* 2024;2024:6628912.
19. Nair I, Bailey PM. Use of the laryngeal mask as a conduit for tracheal intubation. *Anaesthesia.* 1995;50:535–537.
20. Thalagunda HN, others. Comparison of extubation response with Ambu AuraGain and endotracheal tube. *Int J Res Med Sci.* 2024;12:112–118.
21. Carvalho CC, Kapsokalyvas I, El-Boghdadly K. Second-generation supraglottic airway devices versus endotracheal intubation in adults undergoing abdominopelvic surgery: A systematic review and meta-analysis. *Anesth Analg.* 2025;140:265–275.
22. Verghese C, Ramaswamy BL. LMA-Supreme — a new single-use LMA with gastric access: a report on its clinical efficacy. *Br J Anaesth.* 2008;101:405–410.
23. Van Zundert TC, Brimacombe JR, Ferson DZ, Bacon DR, Wilkinson DJ. Archie Brain: celebrating 30 years of development in laryngeal mask airways. *Anaesthesia.* 2012;67:1375–1385.
24. Seet E, others. Postoperative pharyngolaryngeal adverse events with LMA Supreme: low versus high cuff pressure. *Can J Anaesth.* 2014;61:450–456.
25. Vaithalingam B, Bhadrinarayan V, Rudrappa S. Supraglottic airway devices in neuroanaesthesia practice: A narrative review. *J. Anaesthesiol. Clin. Pharmacol.* 2025;41:410–417.
26. Wei CF, Chung YT. Laryngeal mask airway facilitates a safe and smooth emergence from anaesthesia in patients undergoing craniotomy: a prospective randomised controlled study. *BMC Anesth.* 2023;23:47.