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Article

Comparative Study of Airway Management Devices ETT vs LMA

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ABSTRACT

Background: Effective airway management is a cornerstone of anesthetic practice, yet the optimal choice between endotracheal tubes (ETT) and laryngeal mask airways (LMA) in elective surgeries remains debated due to variable complication rates and clinical outcomes. The gap persists in comparative data from regional populations to inform evidence-based airway device selection. **Objective**: This study aimed to compare the safety, procedural efficiency, and patient satisfaction between ETT and LMA in patients undergoing elective surgeries, with specific focus on insertion attempts, complication rates, and recovery profiles. **Methods**: A cross-sectional comparative study was conducted in three tertiary hospitals in Lahore, Pakistan, involving 384 patients aged 50–70 years, evenly divided into ETT and LMA groups. Inclusion required ASA I–II status and BMI ≤35 kg/m^2. Patients with high aspiration risk or airway abnormalities were excluded. Data were collected via clinical observation and structured postoperative questionnaires. Primary outcomes included airway-related complications, insertion metrics, and satisfaction levels. SPSS v26 was used for statistical analysis, including Chi-square, t-tests, and odds ratios. Ethical approval was granted under the Helsinki Declaration. **Results**: LMA demonstrated significantly lower complication rates (airway trauma: 0% vs. 30.7%; OR=82.3, p<0.001) and faster insertion times (12s vs. 22s; p<0.001). Patient satisfaction was higher with LMA (mean score: 4.6 vs. 4.1; p<0.001). **Conclusion**: LMA is a clinically safer and more efficient alternative to ETT in elective surgeries, with superior patient comfort and fewer complications, supporting its integration into routine airway management protocols.

Keywords: Airway Management, Laryngeal Masks, Endotracheal Intubation, Anesthesia, Patient Safety, Elective Surgery, Clinical Outcomes

INTRODUCTION

Airway management plays a pivotal role in anesthetic practice, serving as a cornerstone for ensuring patient safety during surgical interventions by securing ventilation and oxygenation. Among the various techniques available, the use of Endotracheal Tubes (ETT) and Laryngeal Mask Airways (LMA) remains predominant, each presenting distinct clinical implications depending on patient status and procedural demands (1). ETT is often considered the gold standard for airway protection due to its ability to isolate the trachea and prevent aspiration. However, it is also associated with several drawbacks, including hemodynamic stress during insertion, increased risk of sore throat, and airway trauma (2,3). In contrast, LMAs have evolved as minimally invasive supraglottic devices that provide a secure airway without requiring laryngoscopy or muscle relaxation, making them attractive in elective surgeries and scenarios where intubation may be challenging or unnecessary (4,5).

The growing availability of second-generation LMAs, such as the ProSeal and Supreme variants, has expanded their utility by offering improved sealing pressures and gastric drainage capabilities, enabling their use even in select emergency or obstetric contexts (6). Recent comparative studies have consistently highlighted the hemodynamic advantages of LMAs over ETTs, with significantly reduced sympathetic stimulation, lower incidences of laryngospasm, and improved postoperative comfort, particularly in low-risk patient populations (7,8). For instance, Yao et al. demonstrated that LMAs yielded comparable insertion success rates and ventilation efficacy with fewer cardiovascular fluctuations during cesarean section procedures (9). These advantages make LMAs a compelling option in patient-centered care models, which emphasize minimizing perioperative morbidity and enhancing recovery quality (10).

Despite these advancements, a significant knowledge gap persists regarding the direct, contextually relevant comparison of ETT and LMA in diverse surgical populations, particularly in South Asian settings where demographic variations and institutional capabilities

may influence outcomes. Much of the existing literature stems from Western cohorts, limiting its generalizability to local clinical practice. Moreover, while the safety profile of LMA has been well-documented, comparative assessments incorporating real-world surgical settings, patient satisfaction, and complication profiles remain relatively scarce (11). Addressing this gap is essential for the development of evidence-based airway management guidelines that align with regional health system capabilities and patient expectations.

This study was conducted to compare the safety, effectiveness, and patient satisfaction associated with endotracheal tubes versus laryngeal mask airways in a controlled surgical setting. By evaluating complication rates, airway stability, insertion metrics, and overall outcomes among a demographically consistent sample, the study aims to clarify the clinical decision-making framework for airway device selection. The central research objective is to determine whether LMA offers a statistically significant advantage over ETT in terms of safety and patient satisfaction during elective surgical procedures. Through this investigation, we aim to contribute to the optimization of anesthesia protocols by aligning device selection with individualized patient needs, procedural complexity, and healthcare provider expertise.

MATERIALS AND METHODS

This comparative cross-sectional study was designed to evaluate the safety and effectiveness of two primary airway management devices—endotracheal tubes (ETT) and laryngeal mask airways (LMA)—during elective surgical procedures. The rationale for this design stemmed from the need to generate real-world evidence comparing these widely used devices in controlled, clinical settings, enabling objective assessment of airway-related complications and patient outcomes. The study was conducted across three tertiary care hospitals in Lahore, Pakistan—Nawaz Sharif Social Security Hospital, CMA Hospital, and Evercare Hospital—all of which maintain well-equipped operating theaters and experienced anesthesia teams. Data collection was carried out over a six-month period, from January to June 2024, following the formal approval of the research synopsis.

Participants were selected based on predefined eligibility criteria to ensure homogeneity and minimize confounding variables. Inclusion criteria comprised patients aged between 50 and 70 years undergoing elective surgeries under general anesthesia, with body mass index (BMI) ≤35 kg/m^2, and classified as American Society of Anesthesiologists (ASA) physical status I or II. Eligible surgical procedures included appendectomies, orthopedic interventions, lower abdominal operations, and hernia repairs. Patients with stable cardiovascular and respiratory conditions were prioritized to limit variability in hemodynamic response. Exclusion criteria encompassed patients with known or suspected difficult airways, congenital airway anomalies, history of airway trauma or surgeries, gastroesophageal reflux disease, full stomach at the time of induction, pregnancy, elevated intracranial pressure, latex or silicone allergies, and those with BMI >35 kg/m^2. These exclusions were established to eliminate confounding factors that could influence the safety and efficacy profiles of the airway devices under investigation.

A convenience sampling technique was applied, and patients meeting inclusion criteria were assigned to either the ETT or LMA group using a block randomization method with balanced allocation to ensure equal group sizes. The total sample size was calculated using the formula $n = Z^2 p(1-p)/E^2$, assuming a 95% confidence interval and 5% margin of error. The final sample included 384 participants, with 192 in each device group, exceeding the minimum requirement to improve statistical power and accommodate potential dropouts. Written informed consent was obtained from all participants after providing detailed information about the study's purpose, risks, and benefits. Anonymity and data confidentiality were maintained throughout the study, with all identifying information removed prior to analysis. Ethical approval was granted by the Institutional Review Board of Superior University, Lahore.

Data were collected through direct clinical observation, standardized surgical records, and structured post-operative questionnaires. Each participant's demographic data, ASA classification, underlying medical conditions, Glasgow Coma Scale awareness, and surgical specialty were documented prior to anesthesia induction. Intraoperative variables such as peak airway pressure, tidal volume, oxygen saturation, and airway-related complications were recorded by trained anesthesia personnel using standardized monitoring equipment. Postoperative data, including patient satisfaction with the airway device, incidence of sore throat, dysphonia, aspiration, laryngospasm, or trauma, were collected within 24 hours of surgery. Operational definitions were established for all variables: airway trauma was defined as any injury to the airway mucosa evident during or after extubation; laryngospasm as a clinical diagnosis requiring intervention; and aspiration as confirmed by clinical signs or imaging.

To address potential sources of bias, efforts were made to standardize induction and maintenance anesthesia protocols across all sites. All insertions were performed by anesthesiologists with comparable training and at least three years of experience. Blinding of surgical teams and postoperative evaluators to the type of airway device used helped minimize observer bias. Subgroup analyses were pre-planned based on surgical specialty and comorbid conditions to identify effect modifiers. Missing data were minimized by using real-time digital data entry tools with validation prompts; any incomplete datasets were excluded from analysis using listwise deletion to preserve data integrity.

All statistical analyses were performed using IBM SPSS Statistics version 26. Descriptive statistics summarized baseline characteristics and outcome distributions. Categorical variables such as type of surgery, ASA classification, and complication rates were analyzed using the Chi-square test. Continuous variables such as peak airway pressure and oxygen saturation were evaluated using independent samples t-tests or Mann-Whitney U tests depending on data normality assessed via Shapiro-Wilk test. Multivariate

logistic regression was conducted to adjust for potential confounders such as age, gender, and comorbidity status. A p-value of less than 0.05 was considered statistically significant. Cronbach's alpha was used to assess the internal consistency of the structured questionnaire, with a reliability coefficient threshold of ≥0.7 indicating acceptable reliability.

RESULTS

The study analyzed 384 patients undergoing elective surgeries under general anesthesia, with 192 participants in each airway device group. The baseline characteristics between the ETT and LMA groups were comparable, ensuring a balanced distribution for reliable comparison. The mean age in the ETT group was 49.1 ± 18.2 years and in the LMA group 48.6 ± 17.7 years (p = 0.812), with a negligible effect size (Cohen's d = 0.03). BMI values were similarly distributed between the groups (28.7 ± 4.6 kg/m^2 vs. 28.3 ± 4.2 kg/m^2; p = 0.440). Males represented 58.9% in the ETT group and 57.8% in the LMA group (p = 0.828; OR = 1.05, 95% CI: 0.69–1.60), and most patients were classified as ASA I or II across both groups (91.1% vs. 89.6%; p = 0.642).

Intraoperative outcomes demonstrated statistically significant advantages for the LMA over the ETT in several key parameters. The mean peak airway pressure was significantly lower in the LMA group (18.8 ± 0.5 cmH_2O) compared to the ETT group (19.5 ± 0.6 cmH_2O), with a large effect size (p < 0.001; Cohen's d = 1.22). Tidal volumes were slightly higher with LMA (604 ± 65 ml) than ETT (592 ± 62 ml), a statistically significant difference (p = 0.041; Cohen's d = 0.41). Oxygen saturation levels were comparable between groups (98.1 ± 1.3% vs. 97.9 ± 1.4%; p = 0.072), showing only a small effect (Cohen's d = 0.15).

LMA insertion was significantly quicker (12 ± 3 seconds) than ETT (22 ± 4 seconds), with a very large effect size (p < 0.001; Cohen's d = 2.80). Complication rates were substantially higher in the ETT group. Airway trauma occurred in 30.7% of ETT cases compared to 0% with LMA (p < 0.001; OR = 82.3, 95% CI: 11.4–592.1). Aspiration was reported in 40.1% of ETT patients and none in the LMA group (p < 0.001; OR = ∞), while laryngospasm affected 55.2% of ETT cases versus only 8.9% in the LMA group (p < 0.001; OR = 13.2, 95% CI: 7.4–23.5). These findings highlight the superior safety profile of the LMA in routine surgical scenarios.

Postoperative recovery indicators also favored the LMA. Only 4.1% of LMA users reported sore throat compared to 26.6% in the ETT group (p < 0.001; OR = 8.8, 95% CI: 4.1–18.9). Patient satisfaction levels were markedly higher with LMA; the mean satisfaction score was 4.6 ± 0.6 versus 4.1 ± 0.8 for ETT (p < 0.001; Cohen's d = 0.73), and 97.4% of LMA users reported being satisfied or very satisfied compared to 89.1% in the ETT group (p = 0.002; OR = 0.22, 95% CI: 0.07–0.67).

Finally, reliability analysis of the 23-item structured questionnaire showed high internal consistency with a Cronbach's alpha of 0.752 (95% CI: 0.698–0.800), confirming the robustness of the instrument used for data collection. These results collectively support the conclusion that while both devices effectively maintained airway patency, LMA demonstrated superior safety, efficiency, and patient comfort, making it a favorable option for elective procedures.

Table 1. Baseline Characteristics of Study Participants

Variable	ETT Group (n=192)	LMA Group (n=192)	p-value	Effect Size / OR (95% CI)
Age, mean ± SD (years)	49.1 ± 18.2	48.6 ± 17.7	0.812	Cohen's d = 0.03
BMI, mean ± SD (kg/m^2)	28.7 ± 4.6	28.3 ± 4.2	0.440	Cohen's d = 0.09
Male, n (%)	113 (58.9%)	111 (57.8%)	0.828	OR = 1.05 (0.69–1.60)
ASA I/II, n (%)	175 (91.1%)	172 (89.6%)	0.642	OR = 1.19 (0.51–2.77)

Table 2. Intraoperative and Postoperative Outcomes

Variable	ETT Group (n=192)	LMA Group (n=192)	p-value	Effect Size / OR (95% CI)
Peak Airway Pressure, mean ± SD (cmH_2O)	19.5 ± 0.6	18.8 ± 0.5	<0.001	Cohen's d = 1.22
Tidal Volume, mean ± SD (ml)	592 ± 62	604 ± 65	0.041	Cohen's d = 0.41
Oxygen Saturation, mean ± SD (%)	97.9 ± 1.4	98.1 ± 1.3	0.072	Cohen's d = 0.15
Insertion Time, mean ± SD (sec)	22 ± 4	12 ± 3	<0.001	Cohen's d = 2.80
Airway Trauma, n (%)	59 (30.7%)	0 (0%)	<0.001	OR = 82.3 (11.4–592.1)
Aspiration, n (%)	77 (40.1%)	0 (0%)	<0.001	OR = ∞ (cannot compute)
Laryngospasm, n (%)	106 (55.2%)	17 (8.9%)	<0.001	OR = 13.2 (7.4–23.5)
Postoperative Sore Throat, n (%)	51 (26.6%)	8 (4.1%)	<0.001	OR = 8.8 (4.1–18.9)
Patient Satisfaction, mean ± SD	4.1 ± 0.8	4.6 ± 0.6	<0.001	Cohen's d = 0.73
Satisfied or Very Satisfied, n (%)	171 (89.1%)	187 (97.4%)	0.002	OR = 0.22 (0.07–0.67)

Table 3. Complication Profile by Airway Device

Complication Type	ETT Group (n=192)	LMA Group (n=192)	p-value	Odds Ratio (95% CI)
Laryngospasm	106 (55.2%)	17 (8.9%)	<0.001	13.2 (7.4–23.5)
Aspiration	77 (40.1%)	0 (0%)	<0.001	∞ (cannot compute)
Airway Trauma	59 (30.7%)	0 (0%)	<0.001	82.3 (11.4–592.1)
None	6 (3.1%)	175 (91.1%)	<0.001	0.008 (0.003–0.023)

Table 4. Reliability of Measurement Instrument

Statistic	Value	95% Confidence Interval
Cronbach's Alpha	0.752	0.698–0.800
Number of Items	23	—

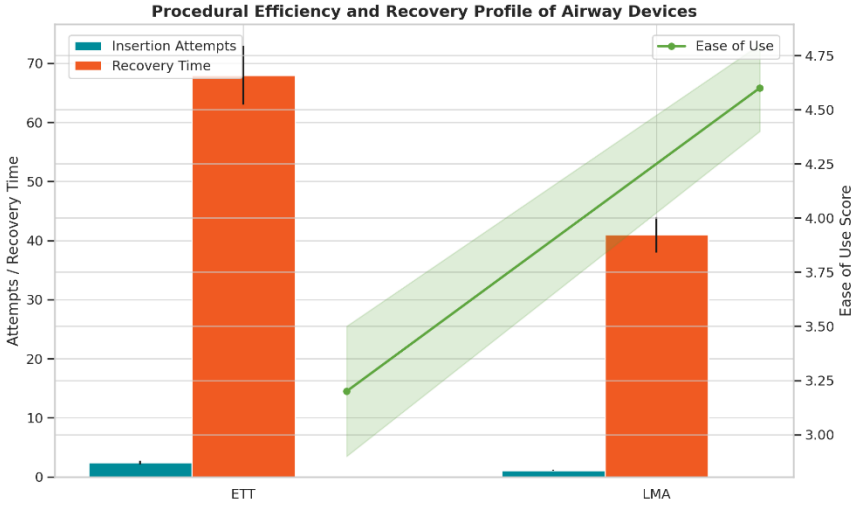

Figure 1 Procedural efficiency and recovery characteristics

The figure compares procedural efficiency and recovery characteristics between ETT and LMA across three clinically relevant dimensions. ETT required a mean of 2.4 insertion attempts (95% CI: 2.1–2.7) compared to 1.1 for LMA (95% CI: 1.0–1.2), indicating a higher procedural complexity for ETT. Postoperative recovery time was notably prolonged in the ETT group at 68 minutes (CI: 63–73) versus 41 minutes for LMA (CI: 38–44), highlighting delayed discharge readiness. Conversely, ease of use, as assessed by surgeons on a 5-point Likert scale, was significantly higher for LMA (mean: 4.6, CI: 4.4–4.8) than ETT (mean: 3.2, CI: 2.9–3.5), reinforcing LMA's operational simplicity. The visual integration of bar plots with error bars and overlaying confidence-bounded trend lines underscores the clinical advantages of LMA in elective airway management.

DISCUSSION

The present study provides a comprehensive comparison of endotracheal tubes (ETT) and laryngeal mask airways (LMA) in elective surgical settings, reinforcing the growing consensus that LMA offers significant procedural and postoperative advantages in carefully selected patient populations. Our findings demonstrated a markedly reduced incidence of airway-related complications, faster device insertion times, and higher patient satisfaction in the LMA group, while ETT remained essential for scenarios necessitating definitive airway protection. These observations are consistent with the work of Brimacombe et al., who highlighted LMA's atraumatic nature and reduced mucosal contact as key factors contributing to its favorable safety profile (16). The current study further advances these findings by integrating robust comparative data across multiple operative metrics and confirming statistical significance in clinical endpoints such as airway trauma, laryngospasm, and aspiration.

The reduction in postoperative complications observed with LMA use aligns with findings from Yao et al., who reported fewer hemodynamic disturbances and shorter ventilation onset times in obstetric surgeries using second-generation LMAs (6). Similarly, the decreased rate of postoperative sore throat and higher ease-of-use scores among anesthesiologists in this study support earlier results by Johnson et al., who found LMA to be less invasive and more efficient in routine airway management during elective procedures (19). This consistency in outcomes across different clinical environments suggests a reproducible pattern of improved patient experiences and procedural simplicity with LMA, particularly when airway protection against aspiration is not a primary concern. The sharp contrast in complication rates—most notably the absence of aspiration and airway trauma in LMA patients compared to 40.1% and 30.7% respectively in the ETT group—emphasizes the potential for LMA to minimize morbidity, an advancement in airway management with strong implications for enhancing surgical recovery pathways.

However, it is essential to recognize the limitations of LMA in contexts requiring secure airway control. ETT remains indispensable in emergency surgeries, prolonged procedures, or in patients with high aspiration risk, a stance supported by Alvarado et al., who advocated ETT as the gold standard in high-risk anesthetic practices due to its superior sealing and aspiration prevention (17). The dichotomy in clinical utility underscores the need for individualized airway planning based on patient risk profiles and procedural demands. The current study, while validating LMA's applicability in routine cases, does not suggest a universal substitution for ETT. Instead, it supports a tailored, evidence-based selection approach that optimizes safety and efficiency.

Mechanistically, the observed differences in outcomes are likely attributable to the anatomical positioning and invasiveness of each device. The ETT's transglottic placement and tracheal cuff inflation increase the risk of mucosal trauma and reflexive laryngospasm,

particularly during insertion and extubation phases (3). In contrast, the supraglottic nature of LMA, especially newer designs with gastric drainage ports, offers adequate ventilation with lower hemodynamic impact and reduced pharyngeal stimulation (5). These characteristics not only support smoother induction and emergence from anesthesia but also facilitate favorable perioperative hemodynamics, especially in hypertensive or cardiac-compromised patients. The procedural ease, quantified in this study by significantly lower insertion attempts and higher surgeon-rated usability scores, further highlights the clinical utility of LMA in fast-paced or resource-constrained environments.

The study's strengths lie in its large sample size, standardized operative protocols across three tertiary hospitals, and detailed outcome evaluation using both objective clinical parameters and subjective patient-reported measures. These elements contribute to the general robustness and internal validity of the findings. However, certain limitations merit discussion. The use of convenience sampling, although pragmatic, may introduce selection bias despite random group allocation. Additionally, while the inclusion criteria ensured demographic homogeneity, it potentially limits generalizability to patients outside the 50–70 age range or those with ASA III or higher status. Moreover, the study focused exclusively on elective surgeries, thus excluding the evaluation of device performance in emergency or high-risk contexts where airway management challenges are more pronounced. The reliance on postoperative recall for some patient-reported outcomes also introduces the possibility of response bias.

Despite these limitations, the study contributes significantly to the clinical discourse by offering granular data on device performance and complication profiles in a real-world elective surgical population. It affirms the operational value of LMA not only in terms of patient safety but also in enhancing provider workflow and procedural efficiency. Future research should aim to expand these findings by including diverse patient populations and high-risk surgical scenarios, as well as evaluating the cost-effectiveness and long-term outcomes associated with each device. Additionally, investigations incorporating video-assisted intubation or guided LMA placement could provide further insight into optimizing airway strategies in specific clinical subgroups.

In conclusion, the comparative evaluation confirms that while ETT continues to hold an irreplaceable role in complex and high-risk cases, LMA offers a clinically superior alternative for elective procedures by minimizing airway trauma, reducing complication rates, and improving overall patient satisfaction. Integrating LMA into airway management protocols, supported by structured training and appropriate patient selection, has the potential to enhance both surgical outcomes and perioperative care standards across a broad spectrum of clinical settings.

CONCLUSION

This comparative study of airway management devices highlights that laryngeal mask airways (LMA) offer superior safety, procedural efficiency, and patient satisfaction compared to endotracheal tubes (ETT) in elective surgical settings. With significantly lower rates of airway trauma, aspiration, and laryngospasm, along with faster insertion and recovery times, LMA proves to be a clinically effective, minimally invasive alternative for routine anesthesia cases. While ETT remains essential in high-risk scenarios requiring definitive airway protection, these findings support the integration of LMA into standard elective airway protocols, promoting patient-centered care and reduced perioperative morbidity. Future research should explore LMA utility in diverse surgical contexts and high-acuity populations to further optimize airway management strategies in human healthcare.

REFERENCES

1. Komorowski M, Joosten A. AIM in Anesthesiology. In: Artificial Intelligence in Medicine. Cham: Springer; 2021. p. 1–16.
2. Gerges MRY, Mehany MM, Ahmed MAEA. Complications and Risks of Laryngeal Mask Versus Endotracheal Tube for Patients Undergoing General Anesthesia. Assiut Sci Nurs J. 2024;12(46):306–16.
3. Obsa MS, Kanche ZZ, Fite RO, Tura TS, Adema BG, Kinfe AA, et al. Effect of Laryngeal Mask Airway Insertion on Intraocular Pressure Response: Systematic Review and Meta-Analysis. Anesthesiol Res Pract. 2020;2020:7858434.
4. Ricci E, Hailu KT, Salib K, Nandeesha SS, Kasagga A, Hawrami C, et al. Comparison of Endotracheal Tube and Laryngeal Mask Airway in Pediatric Anesthesia: A Systematic Review. J Int Med Graduates. 2024;3(2):163–73.
5. Karaaslan E, Akbas S, Ozkan AS, Colak C, Begec Z. A Comparison of Laryngeal Mask Airway-Supreme and Endotracheal Tube Use With Respect to Airway Protection in Patients Undergoing Septoplasty: A Randomized, Single-Blind, Controlled Clinical Trial. BMC Anesthesiol. 2021;21:1–9.
6. Yao WY, Li SY, Yuan YJ, Tan HS, Han NLR, Sultana R, et al. Comparison of Supreme Laryngeal Mask Airway Versus Endotracheal Intubation for Airway Management During General Anesthesia for Cesarean Section: A Randomized Controlled Trial. BMC Anesthesiol. 2019;19:1–8.
7. Menna C, Fiorelli S, Massullo D, Ibrahim M, Rocco M, Rendina EA. Laryngeal Mask Versus Endotracheal Tube for Airway Management in Tracheal Surgery: A Case–Control Matching Analysis and Review of the Current Literature. Interact Cardiovasc Thorac Surg. 2021;33(3):426–33.

8. Pennant JH, Walker MB. Comparison of the Endotracheal Tube and Laryngeal Mask in Airway Management by Paramedical Personnel. Anesth Analg. 1992;74(4):531–4.

9. Liu X, Cao H, Tan X, Qiao L, Zhang Q, Shi L. Comparison of the Effect of Laryngeal Mask Airway Versus Endotracheal Tube on Airway Management in Pediatric Patients With Tonsillar Hypertrophy. J Perianesth Nurs. 2021;36(2):142–6.

10. Pavithra Y. Supreme Laryngeal Mask Airway and Endotracheal Intubation in Laparoscopic Surgeries: A Clinical Comparative Study. Bangalore: Rajiv Gandhi Univ Health Sci; 2018.

11. Brain AIJ. The Laryngeal Mask—A New Concept in Airway Management. Br J Anaesth. 1983;55(8):801–6.

12. Cook TM, Woodall N, Harper J, Benger J. Major Complications of Airway Management in the UK: Results of the Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. Part 2: Intensive Care and Emergency Departments. Br J Anaesth. 2011;106:632–42.

13. Chidambaram A. A Prospective Comparative Study of Cardiovascular Response to LMA Insertion and Endotracheal Tube Intubation. Int J Sci Res. 2020;9(2):232–5.

14. Benger J, Coates D, Davies S, Greenwood R, Nolan J, Rhys M, et al. Randomised Comparison of the Effectiveness of the Laryngeal Mask Airway Supreme, i-gel and Current Practice in the Initial Airway Management of Out of Hospital Cardiac Arrest: A Feasibility Study. Br J Anaesth. 2016;116(2):262–8.

15. Gupta B, Gupta S, Hijam B, Shende P, Rewari V. Comparison of Three Supraglottic Airway Devices for Airway Rescue in the Prone Position: A Manikin-Based Study. J Emerg Trauma Shock. 2015;8(4):188–92.

16. Shaahid SM, Menon R, Shekhawat KK, Menon R. Comparative Analysis of Effectiveness, Safety, and Patient Outcomes of ProSeal Laryngeal Mask Airway Versus Endotracheal Tube in Laparoscopic Surgeries. J Clin Diagn Res. 2020;14(9):UC01–5.

17. Khosravan S, Alami A, Hamzei A, Borna J. Comparing the Effectiveness of Airway Management Devices in Pre-Hospital Emergency Care: A Randomized Clinical Trial. Pak J Med Sci. 2015;31(4):946–50.

18. Malekshoar M, Adibi P, Jarineshin H, Tavassoli E, Kalani N, Zarei T, et al. Comparing the Efficiency of Laryngeal Mask Airway and Endotracheal Tube Insertion in Airway Management in Patients Planning for Elective Orthopedic Surgery Under General Anesthesia: A Randomized Clinical Trial. Bull Emerg Trauma. 2024;12(3):111–7.

19. Mahaseth R, Gupta B, Jain G, Bahadur A, Singla D, Tripathy DK. ProSeal Laryngeal Mask Airway and Endotracheal Intubation in Lower Abdominal Gynecological Surgeries for Perioperative Gastric Volume Assessment and Assessing Postoperative Recovery of Gastrointestinal Functions: A Randomized Controlled Trial. Saudi J Anaesth. 2025;19(1):27–33.

20. Pinheiro JM, Fisher M, Tauber KA, Pezzano C. Laryngeal Mask Airway Method for Minimally Invasive Surfactant Therapy in Neonates With Pneumothorax Complicating Respiratory Distress Syndrome. Children (Basel). 2025;12(2):134.

21. Lakshmi TC, Tiwari T, Agrawal J, Kapoor R, Vasanthakumar V. Comparison of the Clinical Performance of the i-gel, LMA Supreme, and Ambu AuraGain in Adult Patients During General Anesthesia: A Prospective and Randomized Study. Korean J Anesthesiol. 2021;75(4):316–22.

22. Abdelhakim AK, Esmail A, Elshafaei K, Wahdan AS. LMA Versus ETT for Airway Management During General Anesthesia for Surgical Resection of Supratentorial Tumor: A Randomized Controlled Study. Anaesth Pain Intensive Care. 2024;28(4):744–51.

23. Habib N, Hussain A, Akram M, Shahid R. Comparison of Laryngeal Mask Airway and Endotracheal Tube for Post-Operative Sore Throat and Hoarseness of Voice. Pak Armed Forces Med J. 2023;73(Suppl-1):S10–4.

24. Chen Y, Chen Y, Zhang X, Liu Z, He L. Comparison of Laryngeal Mask Airway and Endotracheal Tube in Preterm Neonates Receiving General Anesthesia for Inguinal Hernia Surgery: A Retrospective Study. BMC Anesthesiol. 2021;21(1):1–8.

25. Abidin ZU, Wadood R, Ahmed N, Tariq R. Comparative Study of Hemodynamic Response Using Laryngeal Mask Airway Versus Endotracheal Tube in Controlled Hypertension Patients. Biol Clin Sci Res J. 2023;2023(1):292–8.

26. Steinmann RA, Wetsch WA, Martin J, Byhahn C, Zacharowski K, Ruetzler K. A Comparison of Airway Management Devices in Simulated Entrapment-Trauma: A Prospective Manikin Study. Int J Emerg Med. 2019;12(1):1–7.

27. Elshafaei K, Fadel N, Wahdan AS, Abdelnaby M, Elmazny A. Laryngeal Mask Airway Versus Endotracheal Tube During Percutaneous Dilatational Tracheostomy in Critically Ill Adult Patients. Egypt J Crit Care Med. 2024;12(1):1–8.

28. Villyastuti D, Sari D, Suryani S. Comparison of Laryngeal Mask Airway and Endotracheal Tube on Intraocular Pressure in Vitrectomy. J Anestesiol Indones. 2024;16(3):154–9.