

Original Article

Comparison of Airway Management Using a Laryngeal Mask Airway versus an Endotracheal Tube during Respiratory Emergencies and Their Outcomes

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ABSTRACT

Background: Rapid establishment of a patent airway is fundamental during respiratory emergencies. Endotracheal intubation provides a definitive tracheal airway, whereas the laryngeal mask airway (LMA) offers a supraglottic alternative that may be easier to deploy but provides different airway protection and complication characteristics. **Objective:** To compare use patterns and complications associated with LMA and endotracheal tube (ETT) placement during respiratory emergencies and to describe procedural and patient outcomes. **Methods:** This prospective observational comparative study included 150 adults requiring emergency airway management at Maqsood Medical Complex Hospital, Peshawar, over six months. LMA was used in 76 cases and ETT in 74. Patient, operator, procedural, complication, replacement, survival, and provider-satisfaction data were recorded prospectively. **Results:** LMA and ETT were used in 50.7% and 49.3% of cases, respectively. Any recorded airway complication occurred in 33/76 LMA cases (43.4%) and 14/74 ETT cases (18.9%), corresponding to an unadjusted risk ratio of 2.30 (95% CI 1.34–3.93; Fisher exact $p=0.0015$). Hypoxia occurred in 21 LMA versus three ETT cases, while aspiration occurred in 10 LMA and no ETT cases. Airway trauma and dislodgement were each recorded in one LMA and five ETT cases. Overall adequate oxygenation and effective ventilation were each recorded in 109/150 cases (72.7%). Device replacement was required in 39/150 (26.0%), and 146/150 patients (97.3%) survived to discharge. **Conclusion:** LMA and ETT were both used frequently in this emergency cohort, but their recorded complication profiles differed substantially. LMA use was associated with a higher crude overall complication frequency; however, nonrandom device selection, lack of baseline clinical comparability, and possible confounding by indication prevent causal attribution to device type alone. **Keywords:** Endotracheal Tube; Laryngeal Mask Airway; Respiratory Emergency; Airway Management; Supraglottic Airway; Intubation.

INTRODUCTION

Securing and maintaining a patent airway is a central priority in emergency and critical care because failure of oxygenation or ventilation can rapidly result in neurological injury, cardiovascular deterioration, and death. Contemporary airway guidance emphasizes that the choice and sequencing of airway interventions should account for urgency, anticipated anatomical and physiological difficulty, aspiration risk, operator expertise, available equipment, and the need to maintain oxygenation throughout airway management (1–3).

Endotracheal intubation remains a definitive method of airway control because the tube passes through the vocal cords into the trachea and permits controlled ventilation while providing greater separation of the respiratory tract from pharyngeal and gastric contents. In critically ill patients, however, tracheal intubation is a high-risk procedure rather than a purely technical intervention. Large prospective data demonstrate clinically important rates of peri-intubation hypoxemia, hemodynamic instability, cardiac arrest, and other adverse events, while repeated laryngoscopic attempts further increase the probability of complications (4,5). Physiologically difficult airways may be hazardous even when anatomical visualization is satisfactory, making preoxygenation, hemodynamic optimization, appropriate induction strategy, and early recognition of deterioration important components of emergency airway care (2,3,6). Supraglottic airway devices provide an alternative means of establishing ventilation without direct placement of a tube within the trachea. The laryngeal mask airway sits above the glottic opening and has established roles in anesthesia, rescue ventilation, difficult-airway management, and selected emergency settings (7,8). These devices can reduce the requirement for direct laryngoscopy and tracheal instrumentation, but they do not provide the same anatomical tracheal seal as an appropriately positioned cuffed ETT. Their effectiveness depends on device generation and design, correct positioning, airway pressure, patient anatomy, gastric insufflation, aspiration risk, and operator familiarity (7,8).

Contemporary difficult-airway guidance therefore treats supraglottic airway devices as important components of rescue and alternative airway strategies rather than universal substitutes for tracheal intubation. Both the American Society of Anesthesiologists and Difficult Airway Society guidance emphasize maintaining oxygenation, limiting repeated unsuccessful airway interventions, preparing alternative strategies, and using supraglottic devices when clinically appropriate within a structured failed-airway pathway (1,9).

Evidence directly comparing supraglottic airway strategies with tracheal intubation varies according to clinical setting. In the AIRWAYS-2 randomized clinical trial of out-of-hospital cardiac arrest, an initial supraglottic-airway strategy did not produce a statistically significant improvement in the primary functional outcome compared with tracheal intubation (10). In contrast, the Pragmatic Airway Resuscitation Trial, which compared initial laryngeal-tube insertion with endotracheal intubation in adults with out-of-hospital cardiac arrest, demonstrated that comparative results can differ according to device, endpoint, and treatment system (11). A subsequent systematic review and meta-analysis of randomized trials further emphasized that comparative effects vary across outcomes and that technical airway success should not automatically be equated with improved survival or neurological outcome (12). Resuscitation guidance similarly recognizes that advanced-airway selection should reflect the clinical context and the competence of the treating team rather than an assumption that a single airway technique is optimal in every emergency. During cardiac arrest, both tracheal intubation and supraglottic airway techniques remain accepted options when used by personnel trained in the chosen approach, while minimizing interruptions and avoiding prolonged unsuccessful airway attempts remain important priorities (13).

Major airway audits have demonstrated that serious airway complications occur in emergency departments and critical-care environments and that rescue planning, appropriate equipment, trained personnel, monitoring, and recognition of failed airway strategies are essential to safety (14). Repeated tracheal-intubation attempts are particularly important. Mort demonstrated progressively increasing rates of hypoxemia, aspiration, bradycardia, and cardiac arrest with multiple laryngoscopic attempts during emergency intubation (5). Subsequent emergency-airway research has continued to identify first-pass success as an important procedural quality indicator because additional attempts are associated with greater opportunity for airway trauma, desaturation, and other adverse events (15,16).

More contemporary critical-care data reinforce the importance of patient physiology, operator experience, and procedural environment. The international INTUBE study demonstrated substantial variability in airway-management practices and clinically important peri-intubation adverse events across critically ill populations (4). A prospective emergency-airway study conducted across emergency, intensive-care, and ward environments also demonstrated marked variation in first-pass success according to location and clinical circumstances (17). Secondary analyses of the INTUBE cohort have further highlighted cardiovascular collapse as an important peri-intubation complication and have demonstrated that airway technique and operator factors can influence first-pass performance (18,19). In elective surgical settings, LMA and ETT comparisons frequently demonstrate different physiological and respiratory profiles from those encountered during emergency care. A recent randomized

orthopedic-surgery trial found lower airway pressures and higher dynamic lung compliance with LMA compared with ETT (20). Such elective findings provide useful physiological information but cannot be transferred directly to unstable emergency patients because urgency, aspiration risk, consciousness, underlying disease, fasting status, and physiological reserve differ substantially.

Peri-intubation oxygenation is also influenced by factors other than the definitive airway device. Preoxygenation strategy, severity of pre-existing hypoxemia, duration of apnea, airway difficulty, and number of attempts can all affect oxygenation during emergency airway management (2,3). A 2023 Cochrane review examining apneic oxygenation across prehospital, emergency-department, intensive-care, and operating-theatre settings found that the effect on clinically important hypoxemia remains dependent on context and certainty of evidence, illustrating the multifactorial nature of peri-intubation oxygenation outcomes (21).

Classic descriptions of the LMA emphasize its role as an intermediate airway between face-mask ventilation and tracheal intubation, while contemporary reviews describe a broader family of supraglottic devices with differing sealing, drainage, rescue, and intubation-conduit characteristics (7,8). Correct patient selection and device placement consequently remain essential for effective ventilation and risk reduction.

Data describing how LMA and ETT are selected and used during respiratory emergencies in resource-constrained healthcare environments remain comparatively limited. Equipment availability and clinician familiarity may influence decision-making alongside patient-specific characteristics. Understanding local device utilization, complications, rescue requirements, and provider experience can therefore identify areas in which emergency-airway protocols, equipment provision, monitoring, and training may be strengthened.

The present study compared LMA and ETT use during respiratory emergencies at Maqsood Medical Complex Hospital, Peshawar. It evaluated device utilization, insertion outcomes, recorded complications, device replacement, patient survival, and provider-reported satisfaction, with particular emphasis on differences in complication occurrence between the two airway strategies.

MATERIALS AND METHODS

Study Design and Setting

A prospective observational comparative study was conducted over a six-month period at Maqsood Medical Complex Hospital, Peshawar. The study included adult patients requiring airway management during respiratory emergencies in emergency or critical-care areas.

Participants

A total of 150 patients were included using convenience sampling. Adults aged ≥ 18 years who required airway management for a respiratory emergency and whose clinical situation permitted consideration of either an LMA or ETT were eligible. The study population was limited to patients described as having American Society of Anesthesiologists physical status II–IV (1).

Patients were excluded when upper-airway obstruction prevented LMA use, when the clinical situation specifically required an endotracheal tube or rapid-sequence intubation, when craniofacial abnormalities complicated airway-device placement, when severe allergy to device components was known, when an airway device had already been placed before study data collection, or when death within 24 hours was anticipated.

Data Collection

A structured questionnaire developed from the literature and expert consultation was used to collect demographic, clinical, procedural, and operator information. Trained research assistants recorded data immediately after airway management, with medical records used to supplement procedural information where necessary.

Variables included patient age and sex, airway device used, reason for device selection, operator professional role, operator experience, frequency of managing airway emergencies, first-attempt insertion success, insertion difficulty, oxygenation and ventilation following placement, complications, device replacement, survival to discharge, and provider-reported satisfaction.

Airway management was performed by anesthesiologists, emergency physicians, and emergency technologists according to local clinical practice.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 27. Categorical variables were summarized using frequencies and percentages.

For the principal device comparison, occurrence of any recorded complication was compared between LMA and ETT cases using Fisher's exact test. The crude risk ratio, odds ratio, absolute risk difference, and 95% confidence intervals were calculated from the reported 2×2 table. Individual complication categories were described according to device type.

The original multi-category device-by-complication comparison was also represented descriptively, but the binary any-complication analysis was prioritized because several individual complication categories contained small numbers. Statistical significance was defined as $p < 0.05$.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of Superior University, Lahore, Pakistan. Written informed consent was obtained from conscious and clinically stable patients or from a legally authorized representative when required. Participants could withdraw without affecting clinical care. Study data were anonymized and recorded using unique identification codes.

RESULTS

A total of 150 adults underwent airway management. LMA was used in 76 cases (50.7%) and ETT in 74 (49.3%).

Patient, operator, and device-selection characteristics are summarized in Table 1. Eighty-three patients (55.3%) were male and 67 (44.7%) were female. Most participants were aged between 33 and 50 years.

The operator recorded for each airway episode was an anesthesiologist in 74 cases (49.3%), emergency technologist in 69 (46.0%), and emergency physician in seven (4.7%). Operators had 1–3 years of experience in 83 cases and 4–6 years in 67. Airway emergencies were reportedly managed daily by the operator in 81 cases and monthly in 69.

Device choice was attributed most frequently to operator preference in 70 cases (46.7%) and device availability in 64 (42.7%). Patient condition was identified as the principal reason in 15 cases (10.0%), and ease of insertion in one (0.7%).

Table 1. Patient, Operator, and Airway-Device Characteristics

Domain	Characteristic	n	%
Total	Patients	150	100.0
Sex	Male	83	55.3
	Female	67	44.7
Age	18–25 years	7	4.7
	26–32 years	7	4.7
	33–40 years	67	44.7
	41–50 years	69	46.0
Airway device	LMA	76	50.7
	ETT	74	49.3
Operator role	Anesthesiologist	74	49.3
	Emergency physician	7	4.7
	Emergency technologist	69	46.0
Operator experience	1–3 years	83	55.3
	4–6 years	67	44.7
Frequency managing airway emergencies	Daily	81	54.0
	Monthly	69	46.0
Primary reason for device selection	Operator preference	70	46.7
	Device availability	64	42.7
	Patient condition	15	10.0
	Ease of insertion	1	0.7

First-attempt insertion success was recorded in 122/150 cases (81.3%). An insertion difficulty was recorded in 39/150 (26.0%). Overall adequate oxygenation after placement was recorded in 109 cases (72.7%), and effective ventilation was also recorded in 109 (72.7%).

Device replacement was necessary in 39 cases (26.0%). A specific reason was available for 38 replacement episodes: failed ventilation accounted for 17/38 (44.7%), another complication for 15/38 (39.5%), and dislodgement for 6/38 (15.8%).

Table 2. Procedural and Early Airway Outcomes

Outcome	n	%
First-attempt insertion success	122	81.3
Any recorded insertion difficulty	39	26.0
Adequate oxygenation after placement	109	72.7
Effective ventilation after placement	109	72.7
Device replacement required	39	26.0
Documented reason for replacement, n=38		
Failed ventilation	17	44.7
Complication related to initial device	15	39.5
Dislodgement	6	15.8

Complication patterns differed between the two device groups (Table 3). No complication was recorded in 43/76 LMA cases and 60/74 ETT cases. Consequently, at least one recorded complication occurred in 33 LMA cases (43.4%) compared with 14 ETT cases (18.9%).

The crude risk of any complication was 2.30 times higher in LMA cases than ETT cases (RR 2.30, 95% CI 1.34–3.93). The absolute risk difference was 24.5 percentage points (95% CI 9.7–37.9), and Fisher's exact p value was 0.0015.

Hypoxia was recorded in 21/76 LMA cases compared with 3/74 ETT cases. Aspiration was recorded in 10 LMA cases and no ETT cases. Airway trauma was recorded in one LMA and five ETT cases, while dislodgement was recorded in one LMA and five ETT cases. One cardiac arrest occurred in the ETT group.

Table 3. Complication Profile According to Airway Device

Complication	LMA (n=76), n (%)	ETT (n=74), n (%)	Total
Aspiration	10 (13.2)	0 (0.0)	10
Hypoxia	21 (27.6)	3 (4.1)	24
Airway trauma	1 (1.3)	5 (6.8)	6
Dislodgement	1 (1.3)	5 (6.8)	6
Cardiac arrest	0 (0.0)	1 (1.4)	1
No recorded complication	43 (56.6)	60 (81.1)	103
Any recorded complication	33 (43.4)	14 (18.9)	47

Principal comparison for any complication: RR 2.30 (95% CI 1.34–3.93); OR 3.29 (95% CI 1.57–6.88); absolute risk difference 24.5 percentage points (95% CI 9.7–37.9); Fisher exact p=0.0015.

At discharge, 146 patients (97.3%) were alive and four (2.7%) had died. These outcome data were available for the complete cohort but not stratified by airway device.

Provider satisfaction responses were positive in the majority of airway episodes: 61 responses (40.7%) were "very satisfied" and 46 (30.7%) were "satisfied," corresponding to 107/150 positive responses (71.3%). Twenty-seven responses were dissatisfied and 16 very dissatisfied. In 108 cases (72.0%), the respondent indicated willingness to use the same device again.

Table 4. Overall Patient Outcome and Provider-Reported Experience

Variable	Category	n	%
Status at discharge	Alive	146	97.3
	Deceased	4	2.7
Provider satisfaction	Very satisfied	61	40.7
	Satisfied	46	30.7
	Dissatisfied	27	18.0
	Very dissatisfied	16	10.7
Would use same device again	Yes	108	72.0
	No	42	28.0

DISCUSSION

The present study describes LMA and ETT use during 150 respiratory-emergency airway episodes. Both devices were used with nearly equal frequency, but the observed complication burden differed substantially. Any recorded complication occurred in 43.4% of LMA cases compared with 18.9% of ETT cases, corresponding to a crude risk ratio of 2.30. Hypoxia and aspiration accounted for most LMA-associated adverse events, whereas airway trauma and dislodgement were numerically more frequent with ETT.

These findings require cautious interpretation because the device was not randomly allocated. Selection was attributed primarily to operator preference and equipment availability rather than to an explicitly documented standardized clinical allocation protocol. Patients receiving an LMA may therefore have

differed from patients receiving an ETT in airway anatomy, urgency, aspiration risk, physiological instability, consciousness, diagnosis, anticipated duration of ventilation, or expected airway difficulty. Confounding by indication is a recognized limitation of nonrandomized clinical comparisons when the clinical factors influencing treatment selection are themselves associated with outcome risk (22). Consequently, the crude association observed in this study should not be interpreted as an independent causal effect of LMA placement.

Supraglottic and tracheal airway strategies have distinct and complementary clinical properties. Supraglottic devices can provide rapid rescue ventilation without direct tracheal instrumentation and are embedded within difficult-airway algorithms, while tracheal intubation provides a definitive intratracheal airway when prolonged controlled ventilation or greater protection from pharyngeal and gastric contents is required (1,2,8,9). These complementary roles make universal device comparisons difficult unless clinical indication, airway difficulty, operator competence, and physiological status are adequately controlled.

The observed aspiration pattern is therefore clinically notable but cannot be interpreted as a causal estimate of the intrinsic aspiration risk of LMA. Ten aspiration events were recorded in the LMA group and none in the ETT group. Supraglottic-airway performance and aspiration protection vary across device generations and designs, while patient factors such as consciousness, vomiting, gastric contents, airway pressure, positioning, and emergency indication can influence regurgitation and aspiration risk (7,8). The present dataset did not provide sufficient information on fasting status, consciousness level, vomiting, gastric distension, specific LMA generation, seal pressure, or positioning to account for these factors.

Hypoxia showed a similarly marked crude difference, occurring in 27.6% of LMA cases and 4.1% of ETT cases. Hypoxia during emergency airway management may result from the underlying respiratory emergency, impaired baseline oxygenation, inadequate preoxygenation, prolonged attempts, failed ventilation, airway obstruction, device malposition, hemodynamic instability, or progression of the primary disease rather than the airway device alone (2–6). Emergency and critical-care evidence consistently demonstrates that first-pass failure and repeated airway manipulation are associated with greater procedural risk, while peri-intubation oxygenation strategies may modify oxygen saturation without eliminating the influence of underlying physiological severity (5,15,16,18,21).

The AIRWAYS-2 randomized trial provides important context because it compared an initial supraglottic-airway strategy with tracheal intubation during out-of-hospital cardiac arrest and did not demonstrate superiority of the supraglottic strategy for its primary functional outcome (10). The PART trial also demonstrated that comparative results may depend on the specific supraglottic device, healthcare system, and outcome examined (11). The 2024 systematic review and meta-analysis of randomized trials consequently supports interpretation of supraglottic and tracheal airway approaches within their specific emergency contexts rather than concluding that one advanced-airway technique is universally superior (12). Current resuscitation guidance similarly emphasizes operator competence and minimizing interruption or airway delay rather than prescribing one advanced airway for every cardiac-arrest situation (13).

Elective anesthesia literature provides additional physiological information but differs materially from the present emergency population. Malekshoar et al. reported lower airway pressures and greater dynamic compliance with LMA than ETT during elective orthopedic anesthesia (20). Such comparisons generally involve selected, anesthetized, fasted patients under controlled operating-room conditions. They therefore cannot directly explain the complication rates observed during respiratory emergencies, where physiological instability, altered consciousness, aspiration risk, urgency, and underlying pulmonary disease may dominate clinical outcomes.

The ETT group had more recorded airway-trauma events than the LMA group, although the absolute numbers were small. Direct laryngoscopy and tracheal instrumentation can produce mucosal and laryngeal injury, and systematic evidence from perioperative populations confirms that laryngeal injury and upper-airway symptoms can occur following endotracheal intubation (23). Emergency intubation introduces additional hazards when visualization is difficult or several attempts are required (5,15). The five ETT dislodgement events also warrant attention because secure fixation and subsequent surveillance are essential after successful placement, although the present dataset does not identify the circumstances or timing of those dislodgements.

First-attempt insertion success was recorded in 81.3% of the overall cohort. First-pass performance is widely regarded as an important emergency-airway quality measure because additional attempts expose

patients to longer periods of apnea and repeated instrumentation (5,15,16). However, first-pass success varies substantially across emergency environments. Hall et al. reported variation in first-pass success across emergency-department, intensive-care, and ward settings, while the international INTUBE investigations demonstrated that airway difficulty, operator factors, and technique contribute to procedural performance and complications in critically ill patients (4,17–19). The present dataset did not provide a reliable device-specific first-attempt comparison; therefore, it cannot establish whether LMA or ETT was more likely to succeed on the first attempt.

Insertion difficulty was documented in approximately one-quarter of cases. Anatomical and visualization problems were prominent in the detailed study records, emphasizing that emergency airway management requires not only familiarity with an individual device but also a structured rescue pathway and immediate availability of alternative equipment. Difficult-airway guidance emphasizes anticipation of failure, maintenance of oxygenation, limitation of repeated attempts, and early transition to an alternative strategy when the initial approach is unsuccessful (1,2,9). Major airway-complication audits in emergency and critical-care environments similarly emphasize preparation, monitoring, rescue devices, trained personnel, and escalation planning (14).

Device replacement was required in 26.0% of airway episodes. Failed ventilation was the most frequently documented reason, followed by complications and dislodgement. This substantial replacement frequency indicates that successful emergency airway management should be conceptualized as a dynamic process rather than a single device-placement event. Contemporary airway guidelines emphasize confirmation of effective ventilation, continuous reassessment after device placement, recognition of a failing airway, and prompt progression to a rescue technique when adequate oxygenation or ventilation cannot be maintained (1–3,9).

Provider preference accounted for 46.7% of initial device selection and availability for 42.7%, while patient condition was listed as the principal determinant in only 10.0% of cases. These findings are important because emergency-airway guidance generally advocates a structured decision process integrating airway anatomy, physiological instability, aspiration risk, operator expertise, available resources, and a predefined rescue plan (1–3,6). The high influence of preference and equipment availability in the present study suggests an opportunity to develop more explicit local device-selection pathways and standardized airway carts or equipment protocols while retaining clinician judgment for individual emergencies.

Overall survival to discharge was 97.3%, but survival was not available separately for LMA and ETT cases. It is therefore inappropriate to infer equivalent survival performance between devices from the overall survival rate. Interpretation of this high survival proportion should also consider the eligibility criterion excluding patients in whom death within 24 hours was anticipated, because this criterion may have reduced representation of the most severely ill emergency patients.

Similarly, adequate oxygenation and effective ventilation were each recorded in 72.7% of the total cohort but were not stratified by device. These outcomes consequently describe overall cohort performance and cannot be used to estimate comparative effectiveness of LMA and ETT. Future device-specific analyses would benefit from objective definitions of adequate oxygenation and ventilation, recording of baseline oxygen saturation, post-placement oxygen saturation and end-tidal carbon dioxide, and documentation of the interval from airway decision to successful ventilation.

Provider satisfaction was positive in approximately 71% of cases, and 72% of respondents indicated willingness to use the same device again. These findings demonstrate overall clinician acceptance of the airway approaches used but do not establish comparative satisfaction between LMA and ETT because device-specific satisfaction results were not available. Provider preference may also reflect familiarity, local training, previous experience, and equipment accessibility and should therefore be interpreted separately from objective procedural effectiveness.

The study has several strengths. Data were collected prospectively immediately after airway management, the numbers of LMA and ETT episodes were closely balanced, and complication data could be reconstructed into an interpretable device-level 2×2 comparison. The study also provides local evidence from an emergency-care environment in Pakistan, where equipment availability, training patterns, and workforce structure may differ from large international trial environments.

Important limitations remain. Convenience sampling and the single-centre design reduce generalizability. Device allocation was nonrandom and may have been affected by clinical indication, airway difficulty, operator experience, physiological instability, and device availability. The underlying respiratory emergencies were not characterized sufficiently to compare disease severity or indication

between groups. Definitions and thresholds for adequate oxygenation, effective ventilation, hypoxia, aspiration, and other complications were not specified in the available data. The specific type or generation of LMA was not reported, preventing assessment of whether device design influenced sealing, ventilation, or aspiration-related outcomes. Several procedural variables were internally inconsistent, preventing reliable comparison of detailed insertion-attempt and difficulty categories. No adjusted analysis was available, and survival, oxygenation, ventilation, replacement, first-pass success, and provider-satisfaction outcomes were not consistently stratified by device.

Future studies should prospectively define emergency diagnoses, physiological severity, aspiration risk, airway characteristics, consciousness level, fasting or vomiting status where clinically relevant, preoxygenation strategy, specific airway-device type and generation, operator training, number of attempts, time to effective ventilation, objective oxygenation and ventilation thresholds, confirmation methods, and rescue-airway pathways. Because randomized device allocation may be impractical or inappropriate in many emergency circumstances, well-designed prospective multicentre observational studies incorporating detailed case-mix measurement and adjusted comparative analyses could provide more reliable effectiveness and safety estimates (2–4,22).

CONCLUSION

LMA and ETT were used with almost equal frequency during respiratory emergencies in this cohort. The overall recorded complication frequency was significantly higher among LMA cases than ETT cases, with hypoxia and aspiration accounting for most LMA complications, while airway trauma and dislodgement were numerically more frequent with ETT.

These findings represent crude observational associations rather than proof of device-related causation. Device selection was nonrandom and was influenced strongly by operator preference and equipment availability, while important clinical characteristics of the underlying emergencies were not available for adjustment.

Emergency airway management should therefore emphasize patient-specific device selection, operator competence, objective confirmation of adequate ventilation and oxygenation, immediate recognition of device failure, limitation of repeated unsuccessful attempts, and readiness to transition to an alternative airway strategy when required.

REFERENCES

1. Apfelbaum JL, Hagberg CA, Connis RT, Abdelmalak BB, Agarkar M, Dutton RP, et al. 2022 American Society of Anesthesiologists Practice Guidelines for Management of the Difficult Airway. *Anesthesiology*. 2022;136(1):31–81. doi:10.1097/ALN.0000000000004002.
2. Higgs A, McGrath BA, Goddard C, Rangasami J, Suntharalingam G, Gale R, et al. Guidelines for the management of tracheal intubation in critically ill adults. *Br J Anaesth*. 2018;120(2):323–352. doi:10.1016/j.bja.2017.10.021.
3. Acquisto NM, Mosier JM, Bittner EA, Patanwala AE, Hirsch KG, Cumpston KL, et al. Society of Critical Care Medicine Clinical Practice Guidelines for Rapid Sequence Intubation in the Critically Ill Adult Patient. *Crit Care Med*. 2023;51(10):1411–1430. doi:10.1097/CCM.0000000000006000.
4. Russotto V, Myatra SN, Laffey JG, Tassistro E, Antolini L, Bauer P, et al. Intubation practices and adverse peri-intubation events in critically ill patients from 29 countries. *JAMA*. 2021;325(12):1164–1172. doi:10.1001/jama.2021.1727.
5. Mort TC. Emergency tracheal intubation: complications associated with repeated laryngoscopic attempts. *Anesth Analg*. 2004;99(2):607–613. doi:10.1213/01.ANE.0000122825.04923.15.
6. Kornas RL, Owyang CG, Sakles JC, Foley LJ, Mosier JM; Society for Airway Management's Special Projects Committee. Evaluation and management of the physiologically difficult airway: consensus recommendations from Society for Airway Management. *Anesth Analg*. 2021;132(2):395–405. doi:10.1213/ANE.0000000000005233.
7. Asai T, Morris S. The laryngeal mask airway: its features, effects and role. *Can J Anaesth*. 1994;41(10):930–960. doi:10.1007/BF03010937.
8. Ramachandran SK, Kumar AM. Supraglottic airway devices. *Respir Care*. 2014;59(6):920–931. doi:10.4187/respcare.02976.

9. Frerk C, Mitchell VS, McNarry AF, Mendonca C, Bhagrath R, Patel A, et al. Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults. *Br J Anaesth*. 2015;115(6):827–848. doi:10.1093/bja/aev371.
10. Bengner JR, Kirby K, Black S, Brett SJ, Clout M, Lazaroo MJ, et al. Effect of a strategy of a supraglottic airway device vs tracheal intubation during out-of-hospital cardiac arrest on functional outcome: the AIRWAYS-2 randomized clinical trial. *JAMA*. 2018;320(8):779–791. doi:10.1001/jama.2018.11597.
11. Wang HE, Schmicker RH, Daya MR, Stephens SW, Idris AH, Carlson JN, et al. Effect of a strategy of initial laryngeal tube insertion vs endotracheal intubation on 72-hour survival in adults with out-of-hospital cardiac arrest: a randomized clinical trial. *JAMA*. 2018;320(8):769–778. doi:10.1001/jama.2018.7044.
12. Forestell B, Ramsden S, Sharif S, et al. Supraglottic airway versus tracheal intubation for airway management in out-of-hospital cardiac arrest: a systematic review, meta-analysis, and trial sequential analysis of randomized controlled trials. *Crit Care Med*. 2024;52(2)–e99. doi:10.1097/CCM.00000000000006112.
13. Soar J, Böttiger BW, Carli P, Couper K, Deakin CD, Djävrv T, et al. European Resuscitation Council Guidelines 2021: Adult advanced life support. *Resuscitation*. 2021;161:115–151. doi:10.1016/j.resuscitation.2021.02.010.
14. Cook TM, Woodall N, Harper J, Bengner J; Fourth National Audit Project. 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(5):632–642. doi:10.1093/bja/aer059.
15. Sakles JC, Chiu S, Mosier J, Walker C, Stolz U. The importance of first pass success when performing orotracheal intubation in the emergency department. *Acad Emerg Med*. 2013;20(1):71–78. doi:10.1111/acem.12055.
16. Park L, Zeng I, Brainard A. Systematic review and meta-analysis of first-pass success rates in emergency department intubation: creating a benchmark for emergency airway care. *Emerg Med Australas*. 2017;29(1):40–47. doi:10.1111/1742-6723.12704.
17. Hall T, Leeies M, Funk D, Hrymak C, Siddiqui F, Black H, et al. Emergency airway management in a tertiary trauma centre (AIRMAN): a one-year prospective longitudinal study. *Can J Anaesth*. 2023;70(3):351–358. doi:10.1007/s12630-022-02390-2.
18. Russotto V, Tassistro E, Myatra SN, Parotto M, Antolini L, Bauer PR, et al. Peri-intubation cardiovascular collapse in patients who are critically ill: insights from the INTUBE study. *Am J Respir Crit Care Med*. 2022;206(4):449–458. doi:10.1164/rccm.202111-2575OC.
19. Russotto V, Lascarrou JB, Tassistro E, Parotto M, Antolini L, Bauer P, et al. Efficacy and adverse events profile of videolaryngoscopy in critically ill patients: subanalysis of the INTUBE study. *Br J Anaesth*. 2023;131(3):607–616. doi:10.1016/j.bja.2023.04.022.
20. 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):111–116. doi:10.30476/beat.2024.102372.1509.
21. White LD, Vlok RA, Thang CYC, Tian DH, Melhuish TM. Oxygenation during the apnoeic phase preceding intubation in adults in prehospital, emergency department, intensive care and operating theatre environments. *Cochrane Database Syst Rev*. 2023;8(8). doi:10.1002/14651858.CD013558.pub2.
22. Kyriacou DN, Lewis RJ. Confounding by indication in clinical research. *JAMA*. 2016;316(17):1818–1819. doi:10.1001/jama.2016.16435.
23. Brodsky MB, Akst LM, Jedlanek E, Pandian V, Blackford B, Price C, et al. Laryngeal injury and upper airway symptoms after endotracheal intubation during surgery: a systematic review and meta-analysis. *Anesth Analg*. 2021;132(4):1023–1032. doi:10.1213/ANE.0000000000005276.