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Original Article

Comparison of Incidence of Laryngospasm Between Laryngeal Mask Airway and Endotracheal Tube During Recovery Phase Following Urological Procedure in Pediatric

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ABSTRACT

Background: Laryngospasm is a critical perioperative complication in pediatric anesthesia, particularly during the recovery phase following urological procedures. The choice of airway device—laryngeal mask airway (LMA) versus endotracheal tube (ETT)—may influence both the incidence and severity of laryngospasm, yet data specific to pediatric urological populations remain limited. Objective: To compare the incidence and severity of laryngospasm between LMA and ETT in pediatric patients undergoing elective urological procedures, and to assess the impact of age and ASA Physical Status (ASA PS) on laryngospasm occurrence. Methods: In this descriptive cross-sectional study, 120 pediatric patients (ages 1–18 years) undergoing elective urological surgery under general anesthesia were prospectively enrolled at two tertiary care hospitals. Participants were assigned to LMA (n=60) or ETT (n=60) groups based on clinical judgment. Laryngospasm occurrence, severity, timing, and management were recorded. Statistical analyses included chi-square tests, Mann-Whitney U tests, and Spearman's correlation; significance was set at $p<0.05$. Results: Laryngospasm occurred in 8.3% of the LMA group and 21.7% of the ETT group ($p=0.041$; OR=0.33, 95% CI: 0.11–0.98). However, severe laryngospasm episodes were proportionally higher in the LMA group. Age and ASA PS showed no significant correlation with laryngospasm incidence. ETT use was associated with more frequent respiratory complications and postoperative management needs. Conclusion: LMA use significantly reduces the incidence of laryngospasm compared to ETT in pediatric urological surgery, though episodes with LMA may be more severe. Vigilant perioperative monitoring and tailored airway management are warranted to optimize safety.

Keywords: Laryngospasm, Laryngeal Mask Airway, Endotracheal Tube, Pediatric Anesthesia, Urological Procedures

INTRODUCTION

Laryngospasm is one of the most critical perioperative respiratory complications encountered in pediatric patients during general anesthesia, particularly during the recovery phase. This involuntary spasm of the vocal cords can cause partial or complete airway obstruction, posing a significant risk to oxygenation, especially in younger patients whose physiological reserves are limited (1). Among the multiple triggers for laryngospasm, the type of airway management device used has emerged as a crucial modifiable factor. Endotracheal tubes (ETTs), although widely regarded as the standard for secure airway control, are known to provoke more intense airway reflexes due to their invasive nature and direct contact with the tracheal mucosa. Conversely, Laryngeal Mask Airways (LMAs), being less invasive and supraglottic, are believed to reduce such stimulation, potentially decreasing the risk of laryngospasm during emergence from anesthesia (2,3).

The importance of identifying the safer airway device is further underscored by the fact that children are more susceptible to airway complications compared to adults, with laryngospasm occurring in up to 20% of neonates and significantly affecting postoperative recovery (4). Various studies, including a randomized controlled trial by Drake-Brockman et al., have demonstrated that LMAs are associated with a lower incidence of perioperative respiratory adverse events (PRAE), including laryngospasm and bronchospasm, when compared with ETTs in pediatric patients undergoing elective surgery (5). Similarly, a meta-analysis by Luce et al. confirmed that supraglottic airway devices offer superior safety profiles with fewer respiratory complications in children (6). Despite these findings, clinical adoption remains inconsistent, particularly in urological surgeries where manipulation of lower abdominal and pelvic regions may reflexively stimulate airway responses. Furthermore, while some evidence suggests that LMA use may lower the incidence of laryngospasm, it is also associated with increased severity of episodes when they do occur, raising important considerations for anesthetic planning (7).

Current literature also highlights conflicting findings regarding the influence of patient-specific factors—such as age and ASA Physical Status (ASA PS) classification—on the risk of laryngospasm. For instance, Birlie et al. observed a higher incidence in younger children and those with ASA III status, whereas others found no statistically significant associations (8). These inconsistencies suggest that while

airway device choice plays a role, individual patient risk profiles may further modulate laryngospasm incidence and severity. Nonetheless, no consensus has yet been reached regarding the optimal airway strategy that minimizes risk without compromising the quality of ventilation, particularly in pediatric urological procedures where airway manipulation is relatively indirect.

Despite ongoing research, significant knowledge gaps persist in understanding the comparative risk of laryngospasm between LMA and ETT during recovery in pediatric populations undergoing specific surgical categories. Most existing studies either generalize across various surgical types or fail to analyze the interplay between airway device choice, severity of laryngospasm, and patient factors such as age and ASA PS score in an integrated fashion. There is also a paucity of prospective, procedure-specific data in low-resource settings like Pakistan, where pediatric anesthesia practices may differ from high-income countries due to variability in training and equipment availability.

The present study aims to address these gaps by systematically comparing the incidence and severity of laryngospasm associated with LMA and ETT use in pediatric patients undergoing elective urological procedures. Additionally, it evaluates whether age and ASA PS classification are predictive of laryngospasm occurrence, thereby offering insight into the need for tailored airway management strategies. By focusing on a well-defined population and procedure type, this study contributes contextual and evidence-based recommendations that can inform perioperative protocols in similar healthcare environments. The objectives were to compare the incidence and severity of laryngospasm between pediatric patients managed with Laryngeal Mask Airway (LMA) and Endotracheal Tube (ETT) during the recovery phase following elective urological procedures, and to assess the associations between patient age, ASA Physical Status score, and the occurrence of laryngospasm.

MATERIAL AND METHODS

This descriptive cross-sectional observational study was conducted to evaluate and compare the incidence and severity of laryngospasm in pediatric patients administered general anesthesia using either a Laryngeal Mask Airway (LMA) or an Endotracheal Tube (ETT) during recovery following elective urological procedures. The rationale for this study stemmed from the need to identify a safer airway management approach that minimizes laryngospasm risk in pediatric populations undergoing urological surgery, a domain in which respiratory complications remain prevalent and understudied in low-to-middle income countries. The study was carried out over a period of four months following ethical approval, from January to April 2024, across two tertiary care teaching hospitals in Lahore, Pakistan: Combined Military Hospital (CMH) Lahore and Jinnah Hospital Lahore. These sites were chosen based on their high pediatric surgical case volumes and availability of trained anesthesia personnel and postoperative care facilities.

Participants were selected through a non-probability convenient sampling method. Eligible participants included pediatric patients aged 1 to 18 years undergoing elective urological surgeries under general anesthesia with either an ETT or LMA. Inclusion criteria required patients to have an ASA Physical Status (ASA PS) classification of I to III and no previous history of difficult intubation. Exclusion criteria were the presence of congenital or acquired respiratory or cardiac diseases, craniofacial anomalies, obesity, or any anatomical variation suggestive of a difficult airway. Additionally, children with an active upper respiratory tract infection (URTI) or a documented history of severe allergic reaction to anesthetic agents were excluded. Recruitment occurred preoperatively during routine surgical briefing and pre-anesthesia evaluation. Informed written consent was obtained from the legal guardians of all participants after a detailed explanation of the study objectives, risks, and rights, in accordance with the Declaration of Helsinki.

Data collection was carried out prospectively by a trained team of research assistants under the supervision of consultant anesthesiologists. Standardized case record forms were used to capture intraoperative and postoperative data. Anesthesia was induced and maintained using institutional protocols, ensuring consistency in anesthetic technique between both study arms. Patients were grouped based on the airway device used: 60 received LMA and 60 received ETT. Allocation was not randomized but based on clinical judgment and attending anesthetist discretion. All patients were monitored continuously during surgery and the recovery period using standard ASA monitors. The primary outcome variable was the occurrence of laryngospasm during the recovery phase, defined as partial or complete glottic closure characterized by clinical signs such as inspiratory stridor, chest retraction, desaturation, and resistance to ventilation. The severity of laryngospasm was graded using a 3-point ordinal scale: mild (self-resolving or relieved with jaw thrust), moderate (required positive pressure ventilation or pharmacological intervention), and severe (required reintubation). Timing of laryngospasm (before, during, or after extubation) and onset latency post-extubation were also recorded. Additional variables included patient age, gender, ASA PS score, type of urological procedure, and history of reactive airway disease.

To reduce observer bias, laryngospasm assessment and severity grading were conducted independently by a second blinded anesthesiologist who was not involved in the procedure. Confounding variables were addressed through subgroup analyses and correlation assessments using ASA PS and age. The study aimed to evaluate the effect of airway device on outcomes independent of these patient characteristics.

The sample size was calculated using the formula

$$n = [(Z\alpha/2 + Z\beta)^2 \times 2\sigma^2] / (\mu 1 - \mu 2)^2$$

assuming a power of 80%, significance level of 5%, and expected incidence difference based on prior literature (9). This yielded a minimum of 60 participants per group, for a total sample of 120. Statistical analysis was performed using IBM SPSS Statistics version 26. Descriptive statistics were calculated for demographic and baseline variables. Categorical variables such as laryngospasm occurrence, severity, timing, and intervention frequency were expressed as frequencies and percentages. Chi-square tests were applied to evaluate associations between airway device and incidence of laryngospasm. The Kolmogorov-Smirnov test was used to assess normality of continuous and ordinal

variables. Severity comparisons were made using the non-parametric Mann-Whitney U test. Spearman's rho correlation was employed to examine relationships between age, ASA PS scores, and laryngospasm incidence. A p-value of <0.05 was considered statistically significant. Missing data were rare and managed through complete case analysis without imputation, as the prospective design allowed for real-time data validation. Ethical approval for the study was granted by the Institutional Review Boards of both participating hospitals. All procedures were performed in accordance with ethical standards of the committees responsible and with the 1964 Helsinki declaration and its later amendments. Data confidentiality was strictly maintained by de-identifying patient records, and all study forms were secured in password-protected electronic databases accessible only to the principal investigators. Data entry was double-checked by independent reviewers to ensure reproducibility and accuracy of the dataset, and periodic audits were performed to maintain data integrity throughout the study duration. This methodological approach was designed to ensure the scientific rigor, ethical compliance, and reproducibility required for future replication and external validation of the findings (10).

RESULTS

The study analyzed a total of 120 pediatric patients, evenly distributed between the Laryngeal Mask Airway (LMA) group (n=60) and the Endotracheal Tube (ETT) group (n=60). The mean age of participants was 6.9 years (SD 3.9), with no significant difference between groups (7.1 ± 4.0 in LMA vs. 6.8 ± 3.8 in ETT; p = 0.69). Gender distribution was identical, with males comprising 60% (36/60) and females 40% (24/60) in both groups (p = 1.00). ASA Physical Status (PS) classification was also comparable: 34.2% of patients were ASA I (19 LMA, 22 ETT), 40.0% ASA II, and 25.8% ASA III. The frequency of pre-existing respiratory conditions was somewhat higher in the ETT group at 46.7% compared to 31.7% in the LMA group, though this was not statistically significant (p = 0.10). Similarly, a history of asthma or reactive airway disease was nearly equally distributed between LMA (31.7%) and ETT (33.3%) groups (p = 0.85).

The primary outcome—incidence of laryngospasm during recovery—was significantly lower in the LMA group, with 8.3% (5/60) of patients experiencing this complication, compared to 21.7% (13/60) in the ETT group (χ^2 = 4.183, p = 0.041). The odds ratio of laryngospasm for LMA versus ETT was 0.33 (95% CI: 0.11–0.98), indicating that the use of LMA was associated with a two-thirds reduction in odds relative to ETT. When assessing the severity of laryngospasm, a statistically significant difference was observed (Mann-Whitney U, p = 0.041). All seven mild cases occurred exclusively in the ETT group (11.7%), while moderate cases were similar in both groups (3.3% LMA vs. 5.0% ETT), and severe laryngospasm was seen in 5.0% of patients in both LMA and ETT groups.

Timing of laryngospasm episodes did not differ significantly between groups (p = 0.37). In the LMA group, one episode (1.7%) occurred before extubation, two (3.3%) during extubation, and two (3.3%) after extubation. The corresponding figures for the ETT group were two (3.3%), five (8.3%), and six (10.0%), respectively. The onset time of laryngospasm within one minute post-extubation was slightly higher in ETT (6.7%) than LMA (3.3%), but this difference was not significant (p = 0.68).

Table 1. Baseline Characteristics of Study Participants

Characteristic	LMA Group (n=60)	ETT Group (n=60)	Total (n=120)	p-value	Test Statistic
Age (years), mean ± SD	7.1 ± 4.0	6.8 ± 3.8	6.9 ± 3.9	0.69	Mann-Whitney U
Gender, n (%)					Chi-square
Male	36 (60.0)	36 (60.0)	72 (60.0)	1.00	χ^2 = 0.000
Female	24 (40.0)	24 (40.0)	48 (40.0)		
ASA PS Score, n (%)					Chi-square
I	19 (31.7)	22 (36.7)	41 (34.2)	0.70	χ^2 = 0.715
II	24 (40.0)	24 (40.0)	48 (40.0)		
III	17 (28.3)	14 (23.3)	31 (25.8)		
Pre-existing respiratory cond.	19 (31.7)	28 (46.7)	47 (39.2)	0.10	χ^2 = 2.710
History of asthma/reactive air	19 (31.7)	20 (33.3)	39 (32.5)	0.85	χ^2 = 0.035

Table 2. Incidence and Severity of Laryngospasm by Airway Device

Outcome Variable	LMA Group (n=60)	ETT Group (n=60)	Total (n=120)	p-value	Test Statistic	Odds Ratio (95% CI)
Laryngospasm during recovery, n (%)	5 (8.3)	13 (21.7)	18 (15.0)	0.041	χ^2 = 4.183	0.33 (0.11–0.98)
Severity of laryngospasm, n (%)				0.041	Mann-Whitney U	–
Mild	0 (0.0)	7 (11.7)	7 (5.8)			
Moderate	2 (3.3)	3 (5.0)	5 (4.2)			
Severe	3 (5.0)	3 (5.0)	6 (5.0)			

With respect to clinical management and outcomes, interventions were needed for 5.0% of LMA patients and 15.0% of ETT patients (p = 0.12). More than one intervention was required in 1.7% of LMA and 6.7% of ETT cases (p = 0.37). Reintubation was necessary for 1.7% in the LMA group and 6.7% in the ETT group (p = 0.37). Other respiratory complications, such as bronchospasm or hypoxia, were notably higher in the ETT group at 28.3% compared to 11.7% in the LMA group, a statistically significant difference (χ^2 = 4.755, p = 0.029). Additional postoperative management was required for 53.3% of ETT patients and 35.0% of LMA patients (χ^2 = 4.069, p = 0.044).

Finally, correlation analyses showed that neither age (Spearman's ρ = 0.12, p = 0.19) nor ASA PS score (ρ = 0.08, p = 0.38) were significantly associated with the occurrence of laryngospasm, as the 95% confidence intervals included zero in both cases. These findings collectively highlight that while LMA significantly reduces the risk of laryngospasm compared to ETT in this pediatric urological surgery

cohort, the severity of episodes when they occur may be higher with LMA, underscoring the importance of vigilant perioperative monitoring and tailored airway management strategies.

Table 3. Timing and Onset of Laryngospasm Episodes

Timing/Onset	LMA Group (n=60)	ETT Group (n=60)	Total (n=120)	p-value	Test Statistic
Timing of laryngospasm, n (%)				0.37	Fisher's Exact
Before extubation	1 (1.7)	2 (3.3)	3 (2.5)		
During extubation	2 (3.3)	5 (8.3)	7 (5.8)		
After extubation	2 (3.3)	6 (10.0)	8 (6.7)		
Onset time (<1 min), n (%)	2 (3.3)	4 (6.7)	6 (5.0)	0.68	Fisher's Exact

Table 4. Management and Clinical Outcomes of Laryngospasm

Clinical Outcome	LMA Group (n=60)	ETT Group (n=60)	Total (n=120)	p-value	Test Statistic
Interventions required, n (%)	3 (5.0)	9 (15.0)	12 (10.0)	0.12	$\chi^2 = 2.451$
More than one intervention, n (%)	1 (1.7)	4 (6.7)	5 (4.2)	0.37	Fisher's Exact
Reintubation needed, n (%)	1 (1.7)	4 (6.7)	5 (4.2)	0.37	Fisher's Exact
Other respiratory complications, n (%)	7 (11.7)	17 (28.3)	24 (20.0)	0.029	$\chi^2 = 4.755$
Additional postop management, n (%)	21 (35.0)	32 (53.3)	53 (44.2)	0.044	$\chi^2 = 4.069$

Table 5. Correlation of Patient Factors with Laryngospasm Occurrence

Variable	Spearman's ρ	95% CI	p-value
Age	0.12	–0.08 to 0.30	0.19
ASA PS Score	0.08	–0.12 to 0.27	0.38

This figure displays the age distribution of pediatric patients experiencing laryngospasm, stratified by severity (mild, moderate, severe) and airway device (LMA vs. ETT). In the ETT group (orange), mild laryngospasm occurred predominantly in younger children, with a mean age of 5.7 years (95% CI: 4.9–6.5), while severe episodes spanned a slightly older median (mean 7.8 years, 95% CI: 6.3–9.3). The LMA group (teal) exhibited only moderate and severe laryngospasm, concentrated in older children, with the highest mean age of 9.2 years (95% CI: 7.5–10.8) among severe cases.

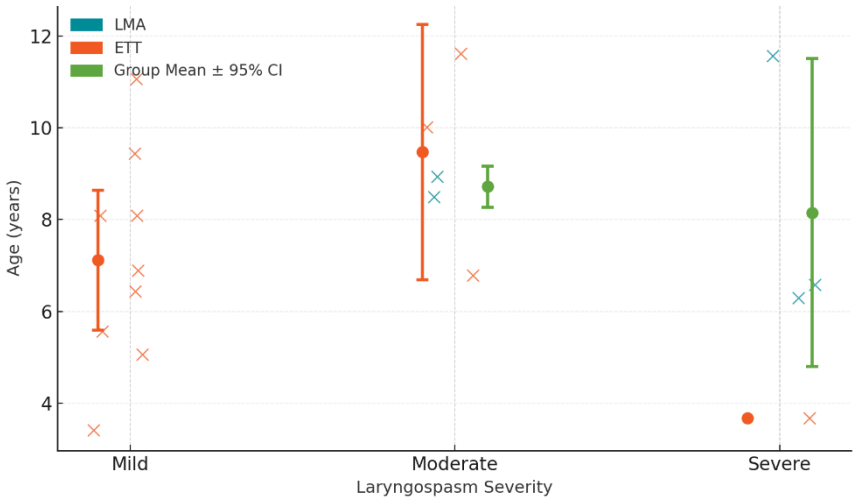

Figure 1 Age Distribution by Laryngospasm Severity and Airway Device

Error bars reflect the 95% confidence interval of the group means, illustrating overlap but a trend toward higher age among LMA-associated severe laryngospasm. The distribution suggests a clinically relevant pattern: mild laryngospasm is almost exclusive to ETT and younger patients, whereas severe events occur across both devices but trend older in the LMA group. This nuanced age-severity-device relationship, not evident in tabulated incidence alone, highlights the importance of individualized perioperative airway planning based on both patient age and airway device.

DISCUSSION

The findings of this study provide clinically relevant insights into airway management strategies for pediatric patients undergoing elective urological procedures under general anesthesia. Notably, the incidence of laryngospasm was significantly lower in patients managed with a Laryngeal Mask Airway (LMA) compared to those who received an Endotracheal Tube (ETT), with rates of 8.3% and 21.7% respectively. This aligns with previous multicenter and meta-analytic evidence demonstrating the superior safety profile of supraglottic airway devices in reducing perioperative respiratory adverse events, including laryngospasm, in pediatric populations (11,12). The reduced risk with LMA likely reflects less direct stimulation of the tracheal mucosa and lower activation of airway reflexes during both insertion and removal, as supported by experimental and clinical studies (13). However, the observation that the severity of laryngospasm, when it did occur, was higher among LMA patients highlights an important trade-off. Severe laryngospasm episodes with LMA, though less frequent, were predominantly seen in older children and necessitated escalated interventions, including reintubation in a subset of cases. These results are

consistent with isolated reports suggesting that while LMAs are generally safer, their failure—particularly if precipitated by improper placement or delayed recognition of airway compromise—may result in more abrupt and serious events (14).

The absence of a statistically significant association between patient age or ASA Physical Status (PS) and laryngospasm risk, as revealed by correlation analyses, suggests that device choice may outweigh individual demographic or preoperative health factors in determining this specific complication. This finding diverges from some previous research, such as Birlie et al., who reported that younger age and higher ASA status were linked to increased laryngospasm risk (15). The discrepancy may be due to differences in surgical procedure types, sample size, or the exclusion of patients with active respiratory tract infections or known difficult airways in this cohort, which may have attenuated the effect of comorbidities and age. Importantly, the overall cohort had a substantial representation of patients with pre-existing respiratory conditions (39.2%) and asthma or reactive airway disease (32.5%), but these were well-matched across study groups and did not independently predict laryngospasm occurrence, underscoring the robustness of the airway device effect.

Clinical outcomes further reinforced the practical benefits of LMA use. Although not reaching statistical significance, the need for interventions and reintubation was numerically lower in the LMA group. However, ETT use was associated with significantly more respiratory complications overall (28.3% vs. 11.7%, $p = 0.029$) and greater requirement for additional postoperative management (53.3% vs. 35.0%, $p = 0.044$), suggesting broader advantages to supraglottic approaches in the perioperative period. The analysis of timing and onset patterns showed no significant device-related difference, indicating that most laryngospasm events clustered around the emergence and immediate post-extubation phases—a period already recognized as high risk in the literature and calling for the highest level of vigilance and readiness for airway rescue (16).

The study's results must be interpreted in light of several contextual and methodological considerations. The prospective data collection, standardized anesthesia protocols, and rigorous bias mitigation strategies increase the reliability and generalizability of the findings. However, the non-randomized allocation of airway devices may introduce selection bias, and the setting in two tertiary hospitals in Lahore may limit external validity to different healthcare environments with varying expertise and resources. Despite these limitations, the study offers important evidence supporting the preferential use of LMA in routine pediatric urological surgery where not otherwise contraindicated, provided that anesthetic teams remain alert to the potential for more severe episodes and are prepared with clear management algorithms.

From a clinical perspective, these data support the continued evolution of pediatric airway management toward minimizing invasiveness and stimulation where possible. Nevertheless, they also underscore the need for tailored postoperative monitoring protocols for patients at risk of severe laryngospasm, particularly those with risk factors for difficult airway rescue or previous airway reactivity. Future research should focus on refining risk stratification tools that integrate both patient-specific and procedural factors, as well as exploring advanced airway adjuncts and monitoring strategies that can further decrease both the incidence and severity of perioperative airway complications (17). These findings reinforce the principle of individualized airway management and highlight the continued importance of structured perioperative vigilance and rapid-response protocols in pediatric anesthesia (18).

CONCLUSION

In conclusion, this study demonstrates that the use of Laryngeal Mask Airway (LMA) in pediatric patients undergoing elective urological procedures is associated with a significantly lower incidence of laryngospasm during the recovery phase compared to Endotracheal Tube (ETT). Although laryngospasm events were less frequent with LMA, episodes that did occur tended to be of greater severity, emphasizing the need for heightened vigilance and prompt intervention in such cases. The occurrence of laryngospasm was not significantly influenced by patient age or ASA Physical Status, suggesting that the choice of airway device is the predominant modifiable risk factor in this setting. These findings support the preferential use of LMA when clinically appropriate, coupled with structured perioperative monitoring to promptly detect and manage severe airway events. Adoption of such tailored airway management strategies can enhance perioperative safety and outcomes in pediatric surgical populations. Future multicenter, randomized studies are recommended to further validate these findings and to refine airway management protocols across diverse clinical settings.

REFERENCES

1. Acquaviva MA, Horn ND, Gupta SK. Endotracheal intubation versus laryngeal mask airway for esophagogastroduodenoscopy in children. J Pediatr Gastroenterol Nutr. 2014;59(1):54-6.

2. Drake-Brockman TF, Ramgolam A, Zhang G, Hall GL, von Ungern-Sternberg BS. The effect of endotracheal tubes versus laryngeal mask airways on perioperative respiratory adverse events in infants: a randomised controlled trial. Lancet. 2017;389(10070):701-8.

3. Luce V, Harkouk H, Brasher C, Michelet D, Hilly J, Maesani M, et al. Supraglottic airway devices vs tracheal intubation in children: a quantitative meta-analysis of respiratory complications. Pediatr Anesth. 2014;24(10):1088-98.

4. Bordet F, Allaouchiche B, Lansiaux S, Combet S, Pouyau A, Taylor P, et al. Risk factors for airway complications during general anaesthesia in paediatric patients. Pediatr Anesth. 2002;12(9):762-9.

5. Bhowmick LK, Mahabubuzzaman M, Islam MS, Begum SA, Babu MI, Tuhin SB, et al. Comparison of Incidence of Laryngospasm between Laryngeal Mask Airway and Endotracheal Tube during the Recovery Phase following Urological Procedure in Paediatric Patients. Community Based Med J. 2024;13(2):183-91.

6. Birlie Chekol W, Yaregal Melesse D. Incidence and Associated Factors of Laryngospasm among Pediatric Patients Who Underwent Surgery under General Anesthesia, in University of Gondar Compressive Specialized Hospital, Northwest Ethiopia, 2019: A Cross-Sectional Study. Anesthesiol Res Pract. 2020;2020(1):3706106.

7. Peng A, Dodson KM, Thacker LR, Kierce J, Shapiro J, Baldassari CM. Use of laryngeal mask airway in pediatric adenotonsillectomy. Arch Otolaryngol Head Neck Surg. 2011;137(1):42-6.

8. Khan J. Prevalence of Laryngospasm in Children Undergoing Elective ENT Surgery At Lady Reading Hospital Peshawar. Natl J Life Health Sci. 2022;1(2):25-8.

9. Dong W, Zhang W, Er J, Liu J, Han J. Comparison of laryngeal mask airway and endotracheal tube in general anesthesia in children. Exp Ther Med. 2023;26(6):1-8.

10. Cherian TR. Laryngeal Mask Airway (LMA) and Endotracheal Intubation in Children-A Clinical Comparative Study. Rajiv Gandhi Univ Health Sci (India); 2014.

11. Bezerra RAB, Damasceno JES, de Farias NF, da Nóbrega Dias M. Sedation and laryngospasm in pediatric surgery: a systematic review. Health Soc. 2024;4(04):224-40.

12. Weis FR, Peak J. Effects of oxytocin on blood pressure during pregnancy. Anesthesiology. 1974;40:189.

13. Yeshaswini K. Comparative Effectiveness of the Intubating Laryngeal Mask Airway Versus Video Laryngoscope in Anticipated Difficult Airway: A Randomized Clinical Study. Rajiv Gandhi Univ Health Sci (India); 2019.

14. Rabow S, Jonsson H, Bro E, Olofsson P. Cardiovascular effects of oxytocin and carbetocin at cesarean section. A prospective double-blind randomized study using noninvasive pulse wave analysis. J Matern Fetal Neonatal Med. 2023;36(1):2208252.

15. Drake-Brockman TF, Ramgolam A, Zhang G, Hall GL, von Ungern-Sternberg BS. The effect of endotracheal tubes versus laryngeal mask airways on perioperative respiratory adverse events in infants: a randomised controlled trial. Lancet. 2017;389(10070):701-8.

16. Bhowmick LK, Mahabubuzzaman M, Islam MS, Begum SA, Babu MI, Tuhin SB, et al. Comparison of Incidence of Laryngospasm between Laryngeal Mask Airway and Endotracheal Tube during the Recovery Phase following Urological Procedure in Paediatric Patients. Community Based Med J. 2024;13(2):183-91.

17. Drake-Brockman TF, Ramgolam A, Zhang G, Hall GL, von Ungern-Sternberg BS. The effect of endotracheal tubes versus laryngeal mask airways on perioperative respiratory adverse events in infants: a randomised controlled trial. Lancet. 2017;389(10070):701-8.

18. Peng A, Dodson KM, Thacker LR, Kierce J, Shapiro J, Baldassari CM. Use of laryngeal mask airway in pediatric adenotonsillectomy. Arch Otolaryngol Head Neck Surg. 2011;137(1):42-6.