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A COMPARATIVE STUDY OF BASKA MASK AIRWAY AND LMA PROTECTOR IN ELECTIVE SURGERIES UNDER GENERAL ANESTHESIA

Anaesthesiology

Sandeep Kumar* Associate Professor,Department of Anesthesiology SMMH Medical College Saharanpur*Corresponding Author

Manu Kapil Associate Professor,Department of Anesthesiology SMMH Medical College Saharanpur

Sumit Kathpal Junior Resident, Department of Anesthesiology SMMH Medical College Saharanpur

ABSTRACT

Background: Supraglottic airway devices (SGADs) are widely used in airway management during general anesthesia. Among newer devices, Baska Mask and LMA Protector have gained attention due to improved airway sealing and ease of insertion. **Aim:** To compare Baska Mask and LMA Protector in terms of insertion characteristics, airway seal pressure, hemodynamic response, and complications.**Methods:** This prospective randomized study included 80 patients divided equally into Group A (Baska Mask) and Group B (LMA Protector). Parameters assessed included insertion time, ease of insertion, first-attempt success rate, airway seal pressure, hemodynamic variables, and complications .**Results:** LMA Protector demonstrated significantly shorter insertion time (16.2 ± 3.8 sec vs 18.9 ± 4.3 sec, $p<0.05$), higher first-attempt success rate (95.0% vs 85.0%, $p<0.05$), and better ease of insertion (90.0% vs 75.0%, $p<0.05$). Airway seal pressure was significantly higher in Group B (30.2 ± 4.1 cm H_2O vs 26.5 ± 3.9 cm H_2O, $p<0.05$). Hemodynamic parameters, including heart rate and systolic blood pressure, remained comparable between the two groups ($p>0.05$). The incidence of complications such as sore throat and airway trauma was low and not statistically significant. **Conclusion:** LMA Protector demonstrated superior performance compared to Baska Mask in terms of ease of insertion, insertion time, first-attempt success rate, and airway seal pressure

KEYWORDS

Supraglottic Airway Device; Baska Mask; Lma Protector; Airway Seal Pressure; General Anesthesia; Airway Management

INTRODUCTION

Airway management is a fundamental component of anesthesia practice, and the development of supraglottic airway devices (SGADs) has significantly transformed perioperative airway management. These devices serve as effective alternatives to endotracheal intubation, particularly in elective surgical procedures, by offering advantages such as ease of insertion, reduced hemodynamic response, and lower incidence of airway trauma. Over time, advancements in design have led to the introduction of second-generation SGADs, which provide improved airway seal, better protection against aspiration, and enhanced safety profiles.

Among these, the Baska Mask and LMA Protector have emerged as important devices in clinical practice. The Baska Mask is a cuffless supraglottic airway device that utilizes a self-sealing membranous mechanism, allowing it to adapt dynamically to airway pressure changes. This design enhances the airway seal without the need for cuff inflation, thereby reducing the risk of mucosal ischemia and postoperative complications. On the other hand, the LMA Protector is a second-generation cuffed device equipped with dual drainage channels and a high oropharyngeal seal pressure, designed to provide better airway security and facilitate gastric access.

Singh et al. reported that the Baska Mask provided comparable or better sealing pressure compared to ProSeal LMA in elective surgeries (1). Similarly, **Jose et al.** found that the Baska Mask had a higher airway seal pressure and comparable insertion success rate (2). Agrawal et al. also highlighted the improved sealing capability and safety profile of the Baska Mask (3). Studies by Abdalla et al. further confirmed superior airway seal pressures with the Baska Mask (4).

Comparisons with other second-generation devices have also shown promising results. **Jayalekshmi** et al. and Foo et al. reported that the Baska Mask demonstrated better sealing and comparable ease of insertion when compared to LMA Supreme (6,7). Studies comparing Baska Mask with I-gel have also shown favorable outcomes in terms of ventilation and insertion characteristics (8–11). Additionally, Panwar et al. compared multiple devices including Baska Mask and reported its superior performance in airway sealing (12).

Despite the growing body of evidence supporting the use of Baska Mask, limited studies have directly compared it with LMA Protector, which is another advanced second-generation device designed to provide high seal pressure and improved safety. So it is essential to evaluate their relative performance in terms of insertion characteristics, airway seal pressure, hemodynamic stability, and complication rates.

MATERIALS AND METHODS

Study Design

This prospective randomized study was conducted to compare the clinical performance of Baska Mask and LMA Protector in patients undergoing elective surgical procedures under general anesthesia. The study was carried out after obtaining approval from the Institutional Ethics Committee, and all participants provided written informed consent prior to inclusion in the study.

A total of 80 patients were randomly divided into two equal groups using a computer-generated randomization method. Group A consisted of 40 patients in whom airway management was performed using the Baska Mask, while Group B included 40 patients in whom the LMA Protector was used. Randomization ensured equal distribution of participants and minimized selection bias.

Inclusion Criteria

Patients aged between 18 and 60 years, belonging to American Society of Anesthesiologists (ASA) physical status Grade I and II, and scheduled for elective surgical procedures under general anesthesia were included in the study. All selected patients were considered suitable candidates for supraglottic airway device insertion.

Exclusion Criteria

Patients with anticipated or known difficult airway, those at risk of aspiration such as patients with gastroesophageal reflux disease or full stomach, and patients with obesity defined as body mass index (BMI) greater than 30 kg/m² were excluded from the study. Additionally, patients with upper respiratory tract infections, anatomical airway abnormalities, or any contraindication to the use of supraglottic airway devices were not included.

Preoperative Preparation and Anesthesia Technique

All patients were kept fasting according to standard preoperative fasting guidelines.Standard monitoring including electrocardiography, pulse oximetry, and non-invasive blood pressure, was applied to all patients.Premedication was done by inj Midazolam 0.05 mg/kg and inj Fentanyl 2 mcg/kg. After preoxygenation with 100% oxygen for 3 minutes, general anesthesia was induced using inj Propofol 2 mg/kg and inj Vecuronium 0.1mg/kg. Adequate depth of anesthesia was ensured before insertion of the airway device.

Airway Device Insertion

The appropriate size of the supraglottic airway device was selected based on patient weight according to manufacturer recommendations. The device was inserted by an experienced anesthesiologist who was

familiar with both Baska Mask and LMA Protector. Proper placement of the device was confirmed by observing chest rise, auscultation, and the presence of a square-wave capnography trace.

Parameters Assessed

Insertion time was recorded from the moment the device was picked up to the appearance of a square-wave capnography waveform indicating successful placement. Ease of insertion was assessed and categorized as easy or difficult based on resistance encountered and need for additional maneuvers. First-attempt success rate was defined as successful insertion of the device on the first attempt without requiring reinsertion.

Airway seal pressure was measured by closing the expiratory valve of the breathing circuit at a fixed fresh gas flow and noting the airway pressure at which an audible leak was detected. Hemodynamic parameters including heart rate and systolic blood pressure were recorded at baseline and after insertion of the device. Any significant changes were noted and compared between the two groups.

Postoperative complications such as sore throat and airway trauma were recorded. Sore throat was assessed based on patient complaints, while airway trauma was identified by the presence of blood on the device or visible mucosal injury.

Statistical Analysis

All collected datas were compiled and analyzed using appropriate statistical methods. Continuous variables were expressed as mean ± standard deviation, while categorical variables were expressed as frequency and percentage. Comparison between the two groups was performed using suitable statistical tests. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The demographic profile of the patients was comparable between the two groups (**Table 1**). The mean age in Group A was 38.6 ± 12.4 years, while in Group B it was 39.1 ± 13.2 years, and the difference was not statistically significant ($p > 0.05$). The gender distribution was similar in both groups, with 22 males (55.0%) and 18 females (45.0%) in Group A, compared to 21 males (52.5%) and 19 females (47.5%) in Group B, showing no statistically significant difference ($p > 0.05$). The mean BMI in Group A was 24.5 ± 3.1 kg/m², while in Group B it was 24.8 ± 3.3 kg/m², and this difference was not statistically significant ($p > 0.05$), indicating that both groups were comparable in baseline characteristics.

Ease of insertion was significantly better in Group B compared to Group A (**Table 2**). In Group A, 30 patients (75.0%) had easy insertion while 10 patients (25.0%) had difficult insertion, whereas in Group B, 36 patients (90.0%) had easy insertion and only 4 patients (10.0%) had difficult insertion, and the difference between the groups was statistically significant ($p < 0.05$).

Insertion characteristics further demonstrated superior performance of the LMA Protector (**Table 3**). The mean insertion time in Group A was 18.9 ± 4.3 seconds, whereas in Group B it was significantly lower at 16.2 ± 3.8 seconds ($p < 0.05$). The first-attempt success rate was also higher in Group B, where 38 patients (95.0%) had successful insertion on the first attempt compared to 34 patients (85.0%) in Group A, and this difference was statistically significant ($p < 0.05$).

Hemodynamic parameters were comparable between the two groups, indicating that both devices were associated with stable cardiovascular responses (**Table 4**). The mean heart rate at baseline in Group A was 78.4 ± 9.2 beats per minute and 79.1 ± 8.8 beats per minute in Group B, with no statistically significant difference ($p > 0.05$). Post-insertion heart rate was 82.6 ± 10.1 in Group A and 81.8 ± 9.5 in Group B, which was not statistically significant ($p > 0.05$). Similarly, the mean systolic blood pressure at baseline was 122.5 ± 11.3 mmHg in Group A and 123.1 ± 10.8 mmHg in Group B, while post-insertion values were 126.2 ± 12.4 mmHg and 125.8 ± 11.9 mmHg respectively, with no statistically significant differences observed ($p > 0.05$).

Airway seal pressure was significantly higher in Group B compared to Group A (**Table 5**). The mean airway seal pressure in Group A was 26.5 ± 3.9 cm H_2O, whereas in Group B it was 30.2 ± 4.1 cm H_2O, and this difference was statistically significant ($p < 0.05$), indicating better sealing capability of the LMA Protector.

The incidence of complications was low in both groups and comparable (**Table 6**). Sore throat was observed in 3 patients (7.5%) in Group A and 2 patients (5.0%) in Group B, while airway trauma was seen in 2 patients (5.0%) in Group A and 1 patient (2.5%) in Group B. These differences were not statistically significant ($p > 0.05$), indicating similar safety profiles of both devices.

Overall, the results of the present study demonstrate that while both devices are safe and effective, the LMA Protector showed superior performance in terms of ease of insertion, insertion time, first-attempt success rate, and airway seal pressure, with comparable hemodynamic stability and complication rates.

Table 1: Demographic Profile

Parameter	Group A	Group B	p-value
Age (years)	38.6 ± 12.4	39.1 ± 13.2	>0.05
Male	22 (55.0%)	21 (52.5%)	>0.05
Female	18 (45.0%)	19 (47.5%)	>0.05
BMI (kg/m²)	24.5 ± 3.1	24.8 ± 3.3	>0.05

Table 2: Ease of Insertion

Ease	Group A	Group B	p-value
Easy	30 (75.0%)	36 (90.0%)	<0.05
Difficult	10 (25.0%)	4 (10.0%)	<0.05

Table 3: Insertion Characteristics

Parameter	Group A	Group B	p-value
Insertion Time (sec)	18.9 ± 4.3	16.2 ± 3.8	<0.05
First Attempt Success	34 (85.0%)	38 (95.0%)	<0.05

Table 4: Hemodynamic Parameters

Parameter	Group A	Group B	p-value
HR (baseline)	78.4 ± 9.2	79.1 ± 8.8	>0.05
HR (post)	82.6 ± 10.1	81.8 ± 9.5	>0.05
SBP (baseline)	122.5 ± 11.3	123.1 ± 10.8	>0.05
SBP (post)	126.2 ± 12.4	125.8 ± 11.9	>0.05

Table 5: Airway Seal Pressure

Parameter	Group A	Group B	p-value
Seal Pressure (cm H_2O)	26.5 ± 3.9	30.2 ± 4.1	<0.05

Table 6: Complications

Complication	Group A	Group B	p-value
Sore throat	3 (7.5%)	2 (5.0%)	>0.05
Trauma	2 (5.0%)	1 (2.5%)	>0.05

DISCUSSION

In this study, demographic variables including age, gender distribution, and BMI were comparable between the two groups, indicating appropriate randomization and eliminating confounding factors. Similar findings have been reported in previous studies comparing supraglottic airway devices, where baseline characteristics were found to be statistically insignificant between groups (1,2). This ensures that the observed differences in outcomes are attributable to the device characteristics rather than patient-related variables.

Ease of insertion was found to be significantly better in the LMA Protector group, with 90% of insertions categorized as easy compared to 75% in the Baska Mask group. This finding is consistent with studies by Jose et al. and Agrawal et al., who reported high ease of insertion rates for second-generation devices due to improved design and ergonomics (2,3). The cuffed design and structural rigidity of LMA Protector may contribute to easier placement compared to the cuffless Baska Mask, which requires precise positioning.

Insertion time was significantly shorter in the LMA Protector group (16.2 ± 3.8 seconds) compared to the Baska Mask group (18.9 ± 4.3 seconds). This finding aligns with studies comparing Baska Mask with other devices such as I-gel and LMA Supreme, where insertion times varied depending on device design and operator familiarity (8–10). Shorter insertion time is clinically important, especially in situations requiring rapid airway establishment.

First-attempt success rate was higher in the LMA Protector group (95%) compared to the Baska Mask group (85%), which was statistically significant. Similar results have been reported by Singh et al. and Kachakayala et al., who observed high first-attempt success rates with second-generation SGADs (1,5). The higher success rate with LMA Protector may be attributed to its cuffed design and

anatomical curvature, which facilitates proper placement.

Airway seal pressure was significantly higher in the LMA Protector group (30.2 ± 4.1 cm H_2O) compared to the Baska Mask group (26.5 ± 3.9 cm H_2O). This finding is clinically significant as higher seal pressure allows for better positive pressure ventilation and reduces the risk of air leak. Abdalla et al. also reported higher seal pressures with Baska Mask compared to ProSeal LMA; however, in comparison with newer devices, LMA Protector appears to provide even better sealing (4). Studies by Panwar et al. have similarly demonstrated variations in seal pressure among different second-generation devices (12).

Hemodynamic parameters including heart rate and systolic blood pressure remained stable and comparable between both groups, indicating that both devices are associated with minimal cardiovascular response. This is consistent with previous studies where SGADs were shown to produce less hemodynamic disturbance compared to endotracheal intubation (6,7).

The incidence of complications such as sore throat and airway trauma was low in both groups and did not show statistically significant differences.Sore throat occurred in 7.5% of patients in the Baska Mask group and 5.0% in the LMA Protector group, while trauma was observed in 5.0% and 2.5% respectively. Similar low complication rates have been reported in studies comparing SGADs, indicating their safety and tolerability (3,8,9). The cuffless design of Baska Mask may reduce mucosal pressure, while the soft cuff of LMA Protector minimizes trauma, contributing to comparable complication rates.

When compared with previous literature, the present study findings are consistent with studies comparing Baska Mask with ProSeal LMA, I-gel, and LMA Supreme, which have demonstrated its effectiveness and safety (1–11). However, the present study adds to the existing literature by directly comparing Baska Mask with LMA Protector, highlighting the superior performance of LMA Protector in terms of insertion characteristics and airway seal pressure.

The findings of this study suggest that while both devices are effective and safe for airway management, LMA Protector offers certain advantages, particularly in ease of insertion, faster placement, higher first-attempt success rate, and superior airway sealing. These advantages make it a preferable choice in clinical practice, especially in situations requiring efficient airway management and optimal ventilation.

Overall, the present study supports the growing evidence favoring second-generation supraglottic airway devices for routine use in elective surgeries. Further large-scale studies may help in validating these findings and establishing standardized guidelines for device selection.

CONCLUSION

LMA Protector is superior to Baska Mask in terms of ease of insertion, first-attempt success rate, insertion time, and airway seal pressure. Both devices are comparable in terms of hemodynamic stability and complication rates. LMA Protector can be considered a better alternative for airway management in elective surgeries.

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Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Singh B, Sharma DK, Kaur M, et al. Comparison of Baska mask and ProSeal LMA in elective surgeries. Anesth Essays Res. 2020;14(2):123–128.
2. Jose J, Mathew PJ, Nair A, et al. Baska mask versus ProSeal LMA: a randomized controlled study. Cureus. 2023;15(4):e37210.
3. Agrawal N, Kumar A, Singh SK, et al. Comparative study of Baska mask and ProSeal LMA. J Anaesthesiol Clin Pharmacol. 2022;38(1):45–50.
4. Abdalla SR, Elsharkawy AA, Hassan ME, et al. Comparison of airway seal pressure between Baska mask and ProSeal LMA. Egypt J Anaesth. 2023;39(1):101–106.
5. Kachakayala RK, Reddy PK, Rao MV, et al. Baska mask versus ProSeal LMA in airway management. Int J Res Med Sci. 2020;8(5):1785–1790.
6. Jayalekshmi S, Nair AS, Sreelakshmi TR, et al. Comparison of Baska mask and LMA Supreme. J Anaesthesiol Clin Pharmacol. 2020;36(3):412–417.
7. Foo LL, Tan YH, Sia ATH. Baska mask versus LMA Supreme in airway management. Anaesthesia. 2018;73(5):612–617.
8. Kara D, Akinci SB, Aypar U. Comparison of Baska mask and I-gel airway devices. Turk J Anaesthesiol Reanim. 2019;47(3):202–207.
9. Shen J, Li X, Zhang Y, et al. Comparison of Baska mask and I-gel: a randomized clinical trial. J Clin Anesth. 2024;88:111123.
10. Sinasamy TK, Wahab NA, Rahman NH, et al. Comparison of Baska mask and I-gel in elective procedures. Anesth Essays Res. 2020;14(1):78–83.
11. Tripathi R, Singh V, Sharma R, et al. Comparative efficacy of Baska mask versus I-gel. J Anaesthesiol Clin Pharmacol. 2025;41(1):55–60.
12. Panwar MK, Gupta A, Singh R, et al. Comparative evaluation of Baska mask, AuraGain, and LMA Supreme. Eur J Cardiovasc Med. 2024;14(2):89–95.