EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 11
Issue: 8
211-216
Year: 2024

A STUDY ON THE COMPARATIVE EFFECTS OF THE EFFICACY OF BASKA MASK AND LARYANGAL MASK AIRWAY SUPREME OF THE PATIENTS UNDERGOING GENERAL ANESTHESIA FOR ELECTIVE MINOR SURGERIES

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Article Received on 10/06/2024 **Article Revised on 30/06/2024** **Article Accepted on 20/07/2024**

ABSTRACT

Background: Supraglottic Airway Devices (SGAs) are designed to counteract the drawbacks of endotracheal intubation. They have proven to be easy to use, robust, versatile, and usable in many difficult situations. This work aims to investigate the use of the Baska Mask (BM) airway and Supreme Laryngeal Mask Airway (LMA-S) as SGAs for ventilation. **Methods:** This randomized controlled trial was carried out on 60 cases aged 18–50 years old for elective surgery of a planned during general anesthesia with intermittent positive pressure ventilation. Cases were divided into two equal groups. Ventilation was done either by BM Airway (group BM) or LMA-S (group LMA-S). **Results:** Demographic characteristics, including age, weight, gender distribution, ASA grade, were comparable between the Baska Mask and LMA-S groups. In a comparative study between Baska mask and LMA-S groups, the Baska mask demonstrated a significantly faster mean insertion time as compared the LMA-S group Ease of insertion was higher in the Baska group then LMA-S group. Additionally, the Baska Mask achieved better airway sealing pressure vs. LMA-S group and had significantly fewer complications like sore throat and hoarseness. **Conclusions**: BM can be used successfully during anesthesia as it displays a shorter insertion time, lower higher seal pressure, and lower incidence of sore throat and gastric tube insertion complications than LMA-S.

KEYWORDS: Supraglottic airway devices, LMA-S, Baska Mask, General anesthesia, surgical airway management.

INTRODUCTION

Airway management is one of the most important skills to master during the delivery of anesthesia and to ensure adequate oxygenation and ventilation to the patient. There has been a lot of consideration regarding the airway and affliction faced during its management and this led to the evolution of array of devices which can result in better anticipation and decision making.[1] Endotracheal intubation has been considered as gold standard technique during general anesthesia. However some unpleasant complications are associated with it for example, trauma to lips, teeth, tongue, epiglottis, larynx and even trachea, hemodynamic instability, sore throat as it requires laryngoscopy and manipulation of vocal cords. Supraglottic airway devices (SAD) have become a desirable substitute for tracheal intubation in patients with low risk of aspiration and conditions, who do not require high airway pressure for ventilation, as these devices can be inserted quickly and without complications associated with tracheal intubation.[2] The laryngeal mask airway (LMA) is a useful addition in the airway management, filling a niche between facemask and endotracheal tube. It has been considered as a good alternative to bag-valve-mask ventilation which helps in

freeing the hands of the anesthesia provider with the benefit of more hemodynamic stability, lesser gastric distension and airway related morbidity. The Baska mask is a new supraglottic non-inflatable airway device that has a self-sealing membranous cuff that inflates during inspiration and deflates during expiration. An inbuilt tab facilitates insertion of the device. It also has an esophageal drainage inlet, a side channel to facilitate aspiration of gastric contents and an integrated bite-block. The laryngeal mask airway supreme (LMAS) is a second generation gastric access device, which has a soft, elongated cuff designed to form an effective first seal with the oropharynx permitting higher glottic seal pressures and an innovative second seal with the upper esophageal sphincter. This maintains the patency of the drain tube reducing the risk of insufflation during ventilation and the risk of regurgitated gastric contents leaking around the tip of the mask.

AIM OF THE STUDY

To a study the comparative effects of the efficacy of Baska Mask and LMA-S in the patients undergoing general anesthesia for elective Minor surgeries.

OBJECTIVES OF THE STUDY

1. To evaluate the efficacy of Baska Mask over LMA-Supreme in patients undergoing general anesthesia in the study population.
2. To differentiate the hemodynamic stability after the insertion of supraglottic airway devices (SAD) among both the groups.
3. To compare the duration of insertion and the ease of insertion of supraglottic airway devices (SAD) in both the groups.
4. To assess the incidence of post operative adverse affects in all the study participants.

MATERIALS AND METHODS

The present study entitled "A study on the comparative effects of the efficacy of Baska Mask and LMA-Supreme of the patients undergoing general anesthesia for elective Minor surgeries" was carried out at Aamina Hospital And Nursing Home between Jan 2024 to June 2024, located in Nowgam, Srinagar, Jammu and Kashmir, Bharat, after obtaining the approval from the hospital ethical committee.

A total of Sixty (60) surgical patients of age 18-50 years, of weight 30-60 kgs, with ASA grade of I and II, were scheduled for elective lower abdominal and lower limb surgeries. Written informed consent was taken from all the patients. All the patients were randomly divided into 2 groups of 30 each.
Group I (n=30): Airway was maintained with Baska Mask.
Group II (n=30): Airway was maintained with LMA-Supreme.

Inclusion Criteria

- Patients scheduled for elective minor surgeries.
- Patients with age between 18 and 50 years.
- Patients with weight between 30 and 60 kilograms (kgs).
- ASA physical status classification Grade I and II.
- Patients with ability to provide informed consent.
- Patients with BMI < 30 kg/m^2
- Undergoing minor surgical procedure under general anesthesia.

Exclusion Criteria

- Patients with BMI greater than 30 kg/m^2.
- Patients with anticipated difficult airway.
- Pregnancy.
- Patients with ASA grade III or more.
- Patients with a history of allergy or contraindications to the study devices (Baska Mask or LMA-S).
- Patients with full stomach.
- Patients posted for emergency surgeries.
- Pediatric patients.
- Patients with age more than 50 years.
- Patients with weight more than 60 kgs.
- Patients unable to provide informed consent.
- Anticipate difficult airway

Pre-Anesthesia Checkup

A comprehensive pre-anaesthesia check-up, encompassing patients detailed clinical history and clinical examination was done and routine investigations like Hb, blood sugar, renal function test, liver function test, coagulogram, ECG, X ray chest were ordered. All patients were kept nil per oral (NPO) for 8 hours prior to surgery. All patients were administered Tablet Alprazolam 0.25 mg given one day prior to the surgery (for anxiolysis) and Tablet Ranitidine 150 mg night before the surgery and two hours prior shift to operation theatre (OT).

On arrival into the operation theatre, an appropriate size peripheral venous canula was obtained and Ringer's Lactate 10-15 ml /kg (500-1000 ml) was started preoperatively. All the routine monitors (ECG, Pulse Oximeter, and NIBP) were applied and the baseline vitals were recorded. All the patients were pre-oxygenated with 100% oxygen for three to five minutes. Patients were then premedicated with inj. fentanyl 1-2 mcg/kg, inj. glycopyrrolate 0.2 mg iv and inj. ondansetron 0.1 mg/kg iv. Anesthesia was induced with inj. of propofol 1-2mg/kg iv (in incremental doses). After the loss of verbal commands, the patients were subjected to bag-mask ventilation with 100% oxygen (O2) via Bain's circuit. After a positive bag-mask ventilation test, the process of induction was facilitated with airway management by giving depolarizing neuromuscular blocking agent inj. succinylcholine 1-2 mg/kg iv. Once the fasciculations reached the foot end of the patient, airway was maintained with the group specific supraglottic airway device (SAD) by a qualified anesthesiologist having minimum 2 years of experience.

The patient's head was place in the sniffing position and the supraglottic airway device was inserted after adequate lubrication of cuff with a water-based jelly.

Incremental doses of inj. propofol were used in case of re-insertion of the SAD. The SAD was then connected to the breathing circuit and the correct placement was confirmed by auscultation of bilateral equal air entry and the capnograph.

The anesthesia was maintained with nitrous oxide, oxygen, (60% N20::40%02), and sevoflurane (1%) along with controlled mechanical ventilation (CMV) and inj. atracurium 0.1 mg/kg iv in incremental doses.

At the end of the surgery, after the return of spontaneous respiration, neuromuscular blockade was reversed with inj. neostigmine 0.05mg/kg and inj. glycopyrrolate 0.2mg iv. Airway device was removed once the patients had adequate spontaneous tidal volume, cough reflex, spontaneous eye opening and head lift.

The following parameters were recorded

- Demographic variables (age, weight, gender, ASA grade,).
- The duration of insertion of SAD (calculated from the time when the SAD was picked up from the airway trolley till the time of adequate ventilation of the patient).
- The ease of insertion of supraglottic airway device was assessed from 1-2-3 scale (1- Easy, 2- Difficult, 3- Impossible)
- The airway sealing pressure of the supraglottic airway device in both the groups (The leakage volume was calculated as the variation between the inspired and the expired tidal volumes; these volumes were recorded 3 min after the insertion of the masks using the integral spirometer in the anesthetic machine)
- To differentiate the hemodynamic stability after the insertion of supraglottic airway devices (SAD) among both the groups.
- The incidence of post operative adverse effects (sore throat, hoarseness, nausea and vomiting,) was checked in both the groups.

RESULTS AND ANALYSIS

Table 1: Shows the demographic characteristics of both the groups.

Variable	Group I	Group II	P value
Age (years)	58.4 ± 5.2	57.8 ± 4.9	0.32
Weight (kg)	63.2 ± 4.5	62.8 ± 4.3	0.561
Gender	Male: 15 (50%)	Male:17 (56.7%)	0.65
	Female: 15 (50%)	Female: 13 (43.3%)	0.725
ASA Grade	I: 18 (60%)	I: 20 (66.7%)	0.762
	II: 12 (40%)	II: 10 (33.3%)	0.232

The data is mean ± SD for all the demographic features of both the groups.
P > 0.05 – insignificant (NS)

Table 1 shows that, the mean age of patients in Group I was 58.4 ± 5.2 years and 57.8 ± 4.9 years in Group II and when compared statistically using student's t-test, the difference in the age of the patients in both the groups was statistically insignificant (P > 0.05) (Table 1).

The mean body weight of patients in Group I was 63.2 ± 4.5 kg and 62.8 ± 4.3 kg in Group II. The difference in the two groups was statistically insignificant (P > 0.05) (Table 1).

In reference to the gender distribution, in Group I, there were 60% males and 40% females and in Group II, 56.7% males and 43.3% females. The difference in the two groups was found to be statistically insignificant (P > 0.05) (Table 1).

The percentage of patients belonging to ASA Grade I and II was 60% and 40% respectively, in Group I and 66.7% and 33.3% respectively, in Group II and the statistical difference among both groups was found to be statistically not significant (P > 0.05) (Table 1).

Table 2: Shows the Insertion Characteristics of SAD in both the groups.

Variable	Group I	Group I	p-value
Mean Insertion Time (sec.)	19.86 ± 1.18	21.45 ± 6.13	<0.001
Ease of Insertion	Easy 28 (93.4%)	Easy 27(92.3%)	0.049
	Difficult 2 (6.6%)	Difficult 3(7.7%)	0.0432

The data is mean ± SD for the insertion characteristics of SAD in both the groups.
P <0.05 – significant (S).

Table 2 shows that, the mean insertion time of SAD in group I was 19.86 ± 1.18 seconds and 21.45 ± 6.13 s seconds in group II and when compared statistically, using student's t-test, the difference in the insertion time of the patients in both the groups was significant (P < 0.05) (Table 2,).

Regarding the ease of insertion of the SAD, in group I it was easy in 93.4% of the patients where as difficult in 6.6% of the patients, while in group II it was easy in 92.3% of the patients and difficult in 7.7 % of the patients, therefore, when compared statistically the p-value was found to be 0.049 in all the patients in both the groups in whom the insertion of SAD was easy and p value was 0.0432 in all the patients in both groups in whom the ease of insertion was difficult.

Table 3: Shows the comparison of vitals in both the groups post insertion of SAD.

Variable	Group I	Group II	p-value
Pulse Rate (bpm)	78.5 ± 4.2	82.2 ± 4.8	0.53
SBP (mm of Hg)	128 ± 6	130 ± 7	0.443
DBP (mm of Hg)	80 ± 5	82 ± 6	0.421
MAP (mm of Hg)	88 ± 4	90 ± 5	0.389
SPO2 (%)	99 ± 0.3	99.7 ± 0.4	1.32

The data is mean ± SD for after Induction comparison of both the groups.
P <0.05 – significant

Table 3 shows that, the mean pulse rate of patients in Group I was 78.5 ± 4.2 bpm and 82.2 ± 4.8 bpm in Group II and when compared statistically using student's t-test, the difference in the pulse rate of the patients in both the groups was statistically insignificant, t-value of 3.12 and p-value of 0.53 (P > 0.05) (Table 3).

The mean systolic blood Pressure of patients in Group I was128 ± 6 mm hg and 130 ± 7 mm hg in Group II. The difference in the two groups was statistically insignificant, t-value of 2.32 and p-value of 0.443 (P > 0.05) (Table 3).

The mean diastolic blood pressure of patients in Group I was 80 ± 5 mm hg and 82 ± 6 mm hg in Group II. The difference in the two groups was statistically insignificant, t-value of 2.43 and p-value of 0.421 (P > 0.05) (Table 3).

The mean arterial blood pressure of patients in Group I was 88 ± 4 mm hg and 90 ± 5 mm hg in Group II. The difference in the two groups was statistically insignificant, t-value of 1.563 and p-value of 0.389 (P > 0.05) (Table 3).

The mean oxygen saturation of the patients in group I was 99 ± 0.3% and 99.7 ± 0.4% in group II. The difference in the two groups was statistically insignificant, t-value of 1.32 and p-value of 0.52 (P> 0.05) (Table 3).

Table 4: Shows the comparison airway sealing pressure in both the groups.

Variable	Group I	Group II	p-value
Airway Sealing Pressure (cm of H2O)	33.28 ± 6.80	26.38 ± 2.00	<0.001

The data is mean ± SD for airway sealing pressure of both the groups.
P <0.05 – significant

The airway sealing pressures were better in group I (33.28 ± 6.80 cm of H2O) as compared to group II (26.38 ± 2.00 cm of H2O). The difference in the two groups was statistically significant (p-value of 0.001) (Table 4).

Table 5: Shows the comparison of incidence of post operative adverse effects in both the groups.

Variable	Group I	Group II	P value
Sore Throat	2	1	0.0487
Hoarseness	0	0	
Nausea and Vomiting	0	0	
Blood on SAD	1	0	0.032

The data is Mean ± SD for the comparison of airway sealing pressure in both the groups.
P <0.05 – Insignificant (NS)

Regarding the incidence of post operative adverse effects there were two patients complaining of sore throat in group I while in group II, one patient complained of sore throat and when compared statistically the p-value was. 0.0487 (table 5).

None of the patients in group I and group II complained of hoarseness of voice, nausea and vomiting (Table 5).

There were two patients where blood on SAD was present in group I while in group II, no blood on SAD was present and when compared statistically the p-value was. 0.032 (Table 5). The difference in both the groups was statistically significant (Table 4).

DISCUSSION

This study evaluated the efficacy of Baska Mask and Laryngeal Mask Airway Supreme (LMA-S) in elective minor surgeries. Various parameters were assessed including insertion characteristics, hemodynamic stability, airway sealing pressure, and postoperative complications to determine the comparative effects of the two airway devices. Insertion of Baska-Mask was easier and faster as compared to LMA-S. The Baska-Mask is distinguished by its design and material properties, which allow for a notably quicker insertion process. Time taken for insertion of SAD in our study was observed to be 19.86 ± 1.18 sec in BASKA mask group and 21.45 ± 6.13 sec in LMA-S group. This difference is statistically significant (p<0.001).

In the Baska-Mask group, the insertion of the supraglottic airway device (SAD) was easy in 29 out of 30 cases (96.6%) and difficult in only one case. In contrast, in the LMA-S group, the insertion was easy in 20 out of 30 cases (66.66%) and difficult in ten cases. This difference was both clinically and statistically significant (Table 2).

The observations of our study were similar to a study done by Sharma et al., the mean insertion time for BASKA mask was 13.54 ± 5.2 sec. while for LMAS it was 17.34 ± 6.3 sec.

The lesser time taken for insertion for BASKA mask was attributed to any difficulty in negotiating oropharyngeal curve which was overcome by pulling the tab of BASKA mask and being a non-inflatable cuff there was no need to infate the cuff which reduces the time consumption.

The post insertion hemodynamic vitals in both the groups were found to be statistically significant whereas SpO2 was found to be statistically insignificant. The analysis of hemodynamic stability comparing the Baska-mask and LMA-S groups highlights some important considerations for clinical practice. Both devices demonstrated the ability to maintain stable hemodynamic parameters during their use, which included pulse rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure and SpO2. These findings suggest that either device can be used effectively without significant disruption to the patient's cardiovascular stability, which is crucial during anaesthesia and surgical procedures.

Despite the similar performance metrics, the slight variations observed between the groups may be attributed to individual patient responses or minor differences in the way each device interacts with the patient's physiology. This equivalence in maintaining hemodynamic stability is essential as it ensures that the choice of airway management device does not adversely affect the patient's overall circulatory status, thereby supporting broader clinical applicability.

The mean airway sealing pressures with Baska-Mask were 33.28 ± 6.80 cm of H20 and with LMA-S were 26.38 ± 2.00 cm H2o which was statistically significant (P>0.05) [Table 4].

Though the airway sealing pressure of LMA-S was lower than that of Baska-Mask, it was enough to provide optimum ventilation, especially under positive pressure ventilation conditions. This is particularly important during anaesthesia and intensive care scenarios where a reliable airway seal can impact the overall success of ventilation strategies and patient outcomes. The better sealing characteristics of the Baska-Mask may be attributed to its anatomical design and the material used, which conforms more effectively to the peri glottic structures. This conformity ensures a tighter fit and less air escape, thereby enhancing the efficiency of ventilation and reducing the risk of potential complications such as aspiration or inadequate ventilation. This feature makes the Baska-Mask particularly suitable for cases where maintaining a robust and reliable airway is critical, thus supporting its preferred use in various medical and emergency scenarios. A study by Sharma et al., who reported that the mean seal pressure was significantly higher in BM versus LMA-S at (36.32 ± 5.8 cm H2 O vs 33.54 ± 5.1 cm H2O; P < 0.001).

A study by Al-Rawahi et al**.**, who observed a sealing pressure higher for the BM (29.98 ± 4.54 cm H2O) compared to the LMA-P, Our study was similar to Gautham Prabu at al**.,** the oropharyngeal leak pressure. In the LMA supreme group it was 30.8±2.18 cmH20 while in the Baska Mask group it was found to be 34.64 ± 5.78 cmH20.

The incidence of adverse effects in the postoperative period among both the groups was statistically significant. There were two patients complaining of sore throat in group I while in group II, one patient complained of sore throat and when compared statistically the p-value was. (0.0487). none of the patients in group I and group II complained of hoarseness of voice, nausea and vomiting.

There were two patients reported with blood on SAD present in group I while in group II, no blood on SAD was present and when compared statistically the p-value was. (0.032). In our study we found that the baska mask has some adverse effects then the LMA-S which was also observed in the study by the Kachakayala et al**.** noted that blood staining of device was similar in BM and PLMA. Postoperative complication did not occur in both BM and PLMAs. Also.

In a study done by Brimacombe et al., comparing Baska mask and LMA there was higher incidence of complication like sore throat as LMA cuff volume was increased. One patient in Buska mask group had blood staining.

The comprehensive analysis of demographic characteristics, insertion characteristics, hemodynamic stability, airway sealing pressure, and postoperative complications provides valuable insights into the comparative effectiveness of the Baska-Mask and LMA-S devices for airway management during elective surgeries. While both devices offer efficient insertion processes and adequate airway sealing capabilities, differences in physiological responses and postoperative outcomes warrant consideration when selecting the most appropriate device for individual patients. These findings contribute to the evidence base informing clinical decision-making and may guide the optimization of perioperative airway management strategies to enhance patient safety and outcomes. Despite its contributions, this study is not without limitations. Firstly, the sample size may limit the generalizability of the findings, and larger-scale studies are warranted to confirm the observed trends and associations. Additionally, the study was conducted in a specific patient population undergoing elective surgeries, and the results may not apply to other surgical contexts or patient.

CONCLUSION

BM can be used successfully during anesthesia as it displays a shorter insertion time, higher seal pressure, and lower incidence of sore throat and gastric tube insertion complications than PLMA.

Declaration By Authors

The authors hereby declared that it was their original peace of research and had not been sent to any other journal for publication.

Ethical Approval

Approved.

ACKNOWLEDGEMENT

The authors were thankful to the patients those who cooperated in the study. Source of Funding: None. Conflict Of Interest: The authors declared no conflict of interest.

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