Original Research Article

A comparative study of Baska mask vs proseal LMA in elective sterilization surgeries

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Abstract

Introduction: Baska mask is a 3rd generation Supraglottic Airway Device (SGA). One of the major limitations of the SGA device is the risk of aspiration.

Aim of the study: Evaluate the advantages of Baska mask over Proseal LMA in providing adequate laryngeal seal and ease of insertion.

Materials and methods: A Randomized prospective single-blinded study. A study group of 40 female patients recruited and divided into 2 groups. Group I (BM-Baska Mask) with 20 patients and Group II (PLM- Proseal LMA) with 20 patients. All patients received general anesthesia with control ventilation. SGA device insertion was done once patients were anesthetized. Baseline intraoperative hemodynamic parameters and capnography were monitored. The ease of insertion was assessed by a number of attempts, time of insertion and any extra maneuver required. The airway pressure calculated as the plateau pressure with fresh gas flow at 6L and APL valve at 70cm H20. In Proseal LMA it was calculated using a handheld manometer.

Results: The success rate of insertion was comparable in 2 groups. The mean time for insertion was 13.3 s while it was 19.7s for PLMA (Pvalue of 0`001). The mean airway sealing pressure was significantly higher in the BM group (p= 0.000). The seal pressure ranged from 20 -29 and 24 -37 in group I and II respectively with P value of 0.001 which makes it significant. There was no significant post-operative laryngopharyngeal morbidity in both groups.

Conclusion: Baska mask provides an adequate seal with better ease of insertion when compared to Proseal LMA.

Key words

Baska mask, Proseal LMA, Time of insertion, Airway pressure, Laryngopharyngeal morbidity, Sterilization surgeries.

Introduction

The era of development of Supra Glottic Airway (SGA) devices to secure the airway started back in 1900 [1]. Wide varieties of supraglottic airway devices are developed to fit the anatomy of the human laryngeal complex in a better way. Laryngeal mask airways, developed by Archie Brain in 1981 marked a paradigm shift, changing the focus of airway management from intubation to just oxygenation and ventilation [2]. It has got its own advantages like less invasive for the respiratory tract, better patient tolerance, ease of insertion. At the same time, it has got drawbacks of not preventing aspirations, as it is not a definitive airway [3]. Several advancements are being tried in newer generations like the advantage of having two drain tubes, a small bowl, and a cuffless device. One of such SGA is the Baska Mask [4]. The Baska mask is a novel supraglottic airway device designed by Australian anesthetists Kanag and Meena Baska (2012). It is an internationally patented SGA available in single-use and multiuse versions. It is equipped with a non-inflatable cuff, an esophageal drainage inlet, and side channels to facilitate aspiration of gastric contents and an integrated bite block [5].

Materials and methods

A Randomized prospective single-blinded study was done. A study group of 40 female patients recruited and divided into 2 groups. Group I (BM-Baska Mask) with 20 patients and Group II (PLM- Proseal LMA) with 20 patients. All patients received general anesthesia with control ventilation. SGA device insertion was done once patients were anesthetized. Baseline intraoperative hemodynamic parameters and capnography were monitored. The ease of insertion was assessed by a number of attempts, time of insertion and any extra maneuver required. The airway pressure calculated as the plateau pressure with fresh gas flow at 6L and APL valve at 70cm H_20. In Proseal LMA it was calculated using a handheld manometer. Patients who belong to ASA I and II, age group between 20-40 years, with a weight between 30-50kg, those with adequate mouth opening (inter-incisor distance >2.5 cm) and those undergoing elective sterilization surgeries were included in the study. Patients with airway abnormalities, anticipated difficult airway, the risk of aspirations (GERD, Hiatus Hernia) were excluded from the study. All patients received general anesthesia with controlled ventilation. All of them were monitored using Pulse oximetry (SPO_2), Noninvasive blood pressure monitoring (NIBP), Electrocardiography (ECG), End-tidal Carbon dioxide (ETCO2) [2, 3]. Baseline pulse rate (PR), Blood pressure (BP), SPO_2 were monitored and recorded every 5 minutes throughout the procedure.

Procedure

Each of them were premedicated with inj. Midazolam 0.01 mg/kg, inj. Glycopyrolate 10 mcg/kg and inj. Metachlorpromide 0.15 mg/kg IM 45 min before induction. After adequate preoxygenation they were induced with inj. propofol 2 mg/kg IV, Inj fentanyl 2mcg/kg IV, O_2, N_2O, Sevoflurane2%, Inj. Atracurium 0.5 mg/kg. Once patients were anesthetized supra glottis airway device insertion was done with the patient in supine and head in the neutral position after 2 minutes of induction. The operator was a skilled anesthesiologist who has 15years of experience in the field of anesthesiology. Baska mask Insertion was done by holding it in between thumb and the index finger [4]. The device was gently slid against the hard palate along with the oropharyngeal curve until a resistance was felt. The tab was used to adjust the angulation of the device with an oropharyngeal curve for better placement. The proseal LMA was also inserted by holding it between the thumb and index finger [4, 9, 10,

12]. Then it was slided against the hard palate until resistance was felt [13, 14]. B/L air entry assessed by B/L chest expansion, SPO_2 and capnography trace which indicates a successful insertion [5, 6]. A maximum of three attempts was permitted for both SGA devices in each patient [2]. If the third attempt is failed, the patients were intubation with a cuffed endotracheal tube. Ease of insertion was assessed with the number of attempts needed, the time required for insertion, maneuver needed for successful insertion (extension of the neck, Jaw thrust and adjusting the device for correct placement, adjusting cuff volume in case of proseal LMA) [12, 15, 16]. The time of insertion was noted by an unblinded observer. The time of insertion is defined as the time from which the device is taken in hand of the operator and successful ventilation was obtained.The cuff pressure obtained in LMA proseal was measured by using a handheld manometer. The airway sealing pressure was measured in cmH_2O at 10 min post placement for Baska mask [2]. This airway pressure was calculated as the plateau pressure with fresh gas flow at 6L and APL valve at 70 cmH_2O. At the end of the procedure both SGA devised were removed after adequate reversal of muscular blockade. At the time of recovery perilaryngeal, morbidity was assessed. The assessment was done by looking for blood staining of the device, oral cavity bleeds and patients were asked for complaints of-of a sore throat, dysphagia, and hoarseness at the end of the surgery and the next day.

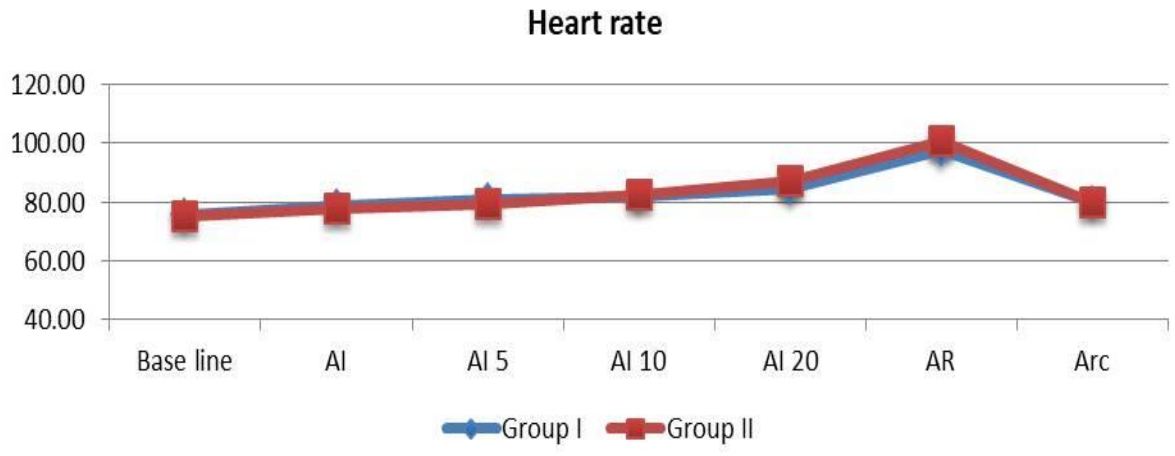
Statistical Analysis

The collected data were analyzed with IBM.SPSS statistics software 23.0 Version. To describe about the data, descriptive statistics frequency analysis, percentage analysis for categorical variables and the mean and S.D. were used for continuous variables. To find the significant difference between the bivariate samples in Independent groups the Unpaired sample t-test was used. To find the significance in categorical data Chi-Square test and Fisher's Exact was used. In all the above statistical tools the probability value 0.05 was considered as a significant level.

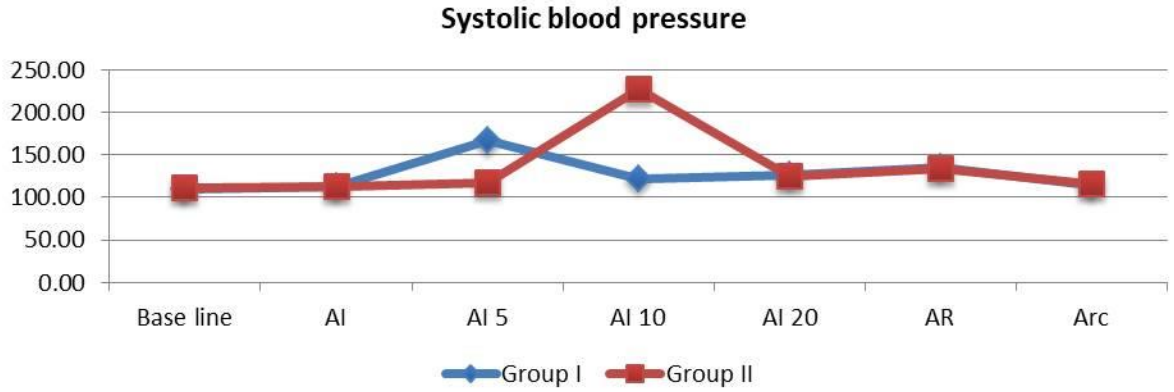
Results

Graph - 1, 2, 3 shows the both groups were comparable with respect to age distribution, weight and baseline parameters like heart rate, blood pressure, and SpO_2. However, there was a significant increase in diastolic BP in Group II during the removal of the SGA device and recovery period (P value: 0.003 and 0.016). There was no significant difference in the mean number of attempts required for SAD placement in either group. The placement of SGA devices was successful in all patients we studied and none of them were excluded from the study.

Graph – 1: Heart rate.



Graph – 2: Systolic blood pressure.



Graph – 3: Diastolic blood pressure.

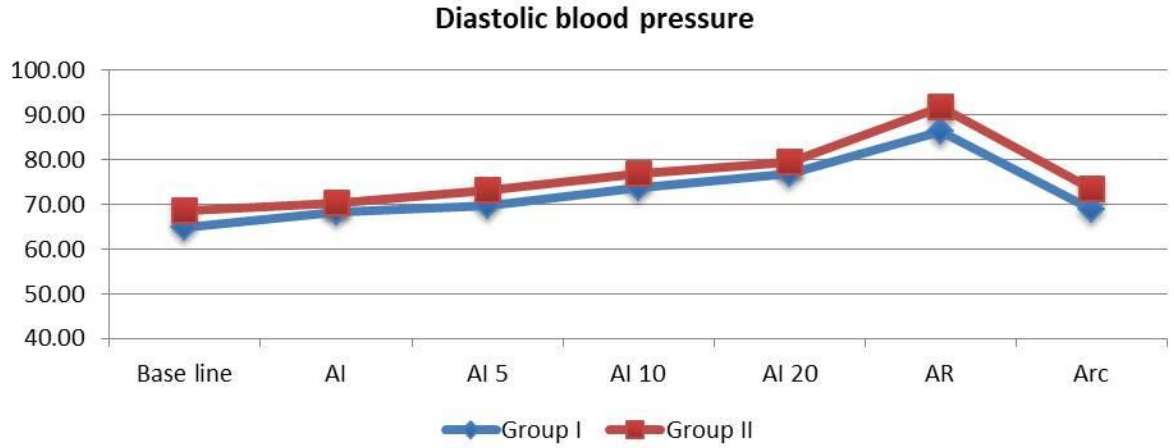


Table – 1: No. of attempts.

No of attempts	1	Count	20	18	38
		% within GROUPS	100.0%	90.0%	95.0%
	2	Count	0	2	2
		% within GROUPS	0.0%	10.0%	5.0%
Total		Count	20	20	40
		% within GROUPS	100.0%	100.0%	100.0%

Table – 2: Time of insertion.

	Groups	**N**	**MEAN**	**STANDARD DEVIATION**	**STANDARD ERROR MEAN**	**P Value**
Time of insertion	Group I	20	13.3	1.5061	.3368	.001
	Group II	20	19.7	5.5861	1.2491	

Table – 3: Airway pressure.

	Group	**N**	**MEAN**	**STANDARD DEVIATION**	**STANDARD ERROR MEAN**	**P Value**
Airway pressure	Group I	20	32.5	3.0522	.6825	.001
	Group II	20	25.5	2.1231	.4747	

There was no significant difference in the mean number of attempts required for SAD placement in either group (**Table – 1).**

The mean insertion time was significantly shorter in the BM group when compared to the PLM group by a mean of 13.3 s while it was 19.7 for PLM (**Table – 2**).

The mean airway sealing pressure was significantly higher in the BM group (p 0.000). The seal pressure ranged from 20 -29 and 24 -37 in group I and II respectively with P value of 0.001 which makes it significant (**Table – 3**). There was no significant perilaryngeal morbidity in both groups.

Discussion

As anesthesiologists we are in still hunting for an ideal supraglottic airway device which is easy to insert, provides a better seal and prevents aspiration. Baska mask is one of the newly introduced devices to fit the anatomy of the oropharynx in a better way [6]. At the beginning of the era of SGA devices researches compared it with Endotracheal tube. There are various studies comparing the advantages of the newer generation of SGA devices with older ones. The studies to establish its advantages of Baska mask over other available supraglottic devices are comparatively less [7]. Maltby JR et al study showed 96.7% success in the insertion of Baska mask and success rate of first insertion attempt was 76.7%The mean airway leak pressure was 35.7 cm^2H_2O [8]. Brain AI, et al. compared Classic LMA with Baska mask and found that the first-time success rate was higher with Classic LMA (98%) than Baska Mask. In our study, we noted that the number of attempts needed to insert the SGA device successfully was similar in both groups. The insertion time was shorter for the group I with a mean of 13.3 s (p-value of 0.001). This will support our hypothesis that ease of insertion is better with Baska mask [9]. The factors that make it easier are 1) Baska mask is cuffless and hence takes shorter time when compared to PLMA which needs the inflation of cuff 2) The oropharyngeal curve can be easily negotiated by pulling the tab of the BM which increases its distal curvature [10]. The proseal LMA has modified cuff to improve the seal and an additional drainage tube to drain gastric contents [11]. There side by side parallel arrangement of the airway tube and gastric tube. Both Baska mask and Proseal LMA has separate draining tubes for gastric contents. But in our study, we noted a significant increase in sealing pressure of Baska mask over PLMA with a mean difference of 7 cmH_2O in spite of being a cuffless device [12]. Thus our study concurs with Laffey, et al. that there is a gradual improvement in BM seal against the glottis over first 2-3 minutes [13]. The thermolability of the membraneous mask makes it easier to fit the laryngeal anatomy thereby providing a better seal [14]. Brimcombe J, et al. and Alexeev, et al. studies also didn't find significant laryngopharyngeal morbidity.No significant laryngopharyngeal morbidity was seen in both groups in our study. The drawbacks of our studies are that we had a limited sample size and it was a single-blinded study. The study was conducted only in female patients. The feasibility of the Baska mask in a male airway is not assessed. And of course, Baska Mask is a new device hence needs a better learning curve [15].

Conclusion

We conclude from the study that BM takes a significantly shorter time in achieving better placement along with a better seal when compared to Proseal LMA without significant laryngopharyngeal morbidity. Hence it will be good add on to the family of SGA devices

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