

ORIGINAL RESEARCH

AIRWAY MANAGEMENT

Comparison of Baska mask airway and i-gel for ease of insertion and hemodynamic stability in patients undergoing general anesthesia

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ABSTRACT

Background and Aim: The use of i-gel and Baska masks in patients receiving general anesthesia has been shown to cause predictable changes in hemodynamic parameters and ease of insertion, according to published research. Better sealing pressure has also been demonstrated when using Baska masks.

However, it is still need to assess whether these methods are preferable to i-gel in terms of insertion ease and hemodynamic stability. In order to assess the Baska mask and i-gel for hemodynamic stability and ease of insertion in patients receiving general anesthesia, this study was carried out.

Methodology: A total of 110 patients were examined for predetermined goals in this randomized prospective observational trial. Patients between the ages of 18 and 45 year, both male and female, were included. Strict inclusion and exclusion standards were adhered to, and each participant gave their informed consent. A questionnaire was filled with personal information of the patient, the diagnosis, the course of treatment, and any complications that were experienced.

The patients were allocated into two groups of fifty-five each. After routine general anesthesia, patients in Group B were ventilated using a Baska mask, while patients in Group I were ventilated using i-gel. Ease of insertion, number of attempts required and hemodynamic parameters including, systolic, diastolic and mean BP and pulse rates, were noted. Using SPSS software version 22, basic statistical analysis of the data generated, was performed.

Results: The results found no significant differences between Group B and Group I, regarding mean HR before onset, after onset at one min, at 3 min, and at 5 min. There was no significant difference between Group B and Group I, regarding mean systolic SBP at pre-insertion, post-insertion at one min, at 3 min, and at 5 min. However, the mean DBP between Group B and Group I at pre-insertion, at 3 min, and at 5 min were highly significant.

Conclusion: Given the limitations of the study, we conclude that, although the Baska mask required more time and attempts to insert than the i-gel, it was still one of the more innovative supraglottic airway devices that produced a better peri-laryngeal seal. Before and after insertion, there was no discernible difference in the hemodynamic parameter between the two groups.

Keywords: Baska Mask Airway, i-gel, Anesthesia, Hemodynamic Stability, Complications

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1. INTRODUCTION

Control of the airway to ensure proper ventilation during general anesthesia is the primary duty of an anesthesiologist. Therefore, unless careful measures are taken to ensure a patent airway, no anesthesia is safe.¹ Endotracheal intubation remains the gold standard for maintaining a patent airway as of right now. However, endotracheal intubation takes time, a trained anesthesiologist, and the right intubation equipment.

Because of its benefits, including simpler entry, improved tolerance, and hemodynamic stability, the supraglottic airway device has emerged as a viable alternative to endotracheal intubation as anesthesia techniques for airway management have advanced. Additionally, with increased airway pressure during laparoscopic procedures, it can aid in ensuring proper ventilation.² It is possible to employ supraglottic devices for both controlled and spontaneous ventilation. As implied by the name, they ventilate the patient by supplying gases at level higher than the vocal cords.^{3,4}

Many supraglottic airway devices have been used in the past. Second generation supraglottic airway devices were developed over time as a consequence of various improvements. These devices reduced the danger of aspiration by implementing a gastric port for the evacuation of stomach contents, hence enabling higher positive airway pressure.⁵ One example of an evolving peri-laryngeal sealer second generation supraglottic device is I-gel (Intersurgical Ltd.). It's composed of a soft gel like material. The Baska mask, manufactured by Logikal Health Products, is a cutting-edge third-generation supraglottic device that provides quick access, efficient ventilation, and a strong seal for emptying the stomach.⁶ Comparing the i-gel supraglottic airway device to the Baska mask entails assessing a number of variables, such as their applicability, design, performance aspects, and results.

There aren't many research papers comparing the practicality of the two devices or evaluating the effectiveness of Baska mask. Thus, the purpose of this study was to evaluate the effectiveness of the Baska mask and compare its ease of insertion and hemodynamic stability with that of i-gel.

Aims and objectives

The purpose of the study was to assess the hemodynamic stability and ease of insertion of the Baska mask and i-gel in patients receiving general anesthesia. Additionally, during the insertion of the i-gel and Baska mask, the ease of insertion, hemodynamic parameters, and any complications were assessed.

2. METHODOLOGY

2.1. Study design

Better sealing pressure can be achieved by using Baska masks sensibly, but in order to draw conclusions, it is necessary to evaluate how well it perform in comparison to i-gel in terms of hemodynamic stability and ease of insertion. Thus, the purpose of this study was to determine if the use of i-gel and Baska masks in patients receiving general anesthesia significantly alters the hemodynamic parameters or ease of insertion. The null hypothesis stated that the two supraglottic airway devices were similar in terms of ease of insertion and hemodynamic characteristics.

2.2. Supplies and procedures

Prior to conducting the study, approval from the institutional ethics committee was obtained. The study involved 110 patients undergoing elective procedures at the Department of Anesthesiology, Integral Institute of Medical Sciences, Lucknow, between September 2022 and March 2024. Patients of both genders, ages 18 to 45 yr, ASA Grade I and II, posted for a range of general anesthesia for surgical procedures.

While patients with restricted mouth opening and predicted difficult airway (per DAS criteria), BMI >35 kg/m² with high aspiration risk (e.g., GERD, hiatus hernia, oropharyngeal pathology), pregnancy, ASA II or more, hypertension, and emergency patients were excluded. The staff personnel created a confidential questionnaire and used the local language to gather the patient's history. Using computer software, patients were randomly allocated to either group and given a serial number.

The premedication consisted of fentanyl 1-2 µg/kg, glycopyrrolate 10 µg/kg, ondansetron 0.1 mg/kg, and midazolam 0.05 mg/kg intravenously, and ventilating the patient with 100% oxygen for 3 min. The patient was

Parameter	Group B (n = 55)	Group I (n = 55)	t	P-Value
Weight (kg)	61.48 ± 5.85	59.96 ± 5.82	1.299	0.197
Height (m)	1.61 ± 0.09	1.59 ± 0.09	0.970	0.334
BMI (kg/m ²)	23.70 ± 1.81	23.63 ± 1.79	0.209	0.835
ASA				
I	44 (80.00)	43 (78.18)	1.112**	0.815
II	11 (20.00)	12 (21.82)		
** Chi Sq. Data given as Mean ± SD or n (%)				

Time	HR (per min)		t	P-value
	Group B (n = 55)	Group I (n = 55)		
Pre insertion	96.07 ± 12.97	88.09 ± 14.03	2.944	0.004
Post insertion -1 min	97.37 ± 16.75	87.65 ± 11.71	3.222	0.002
Post insertion - 3 min	96.82 ± 20.65	87.25 ± 13.35	2.649	0.010
Post insertion -5 min	96.82 ± 12.61	84.33 ± 10.78	5.026	0.000

Time	SBP (mmHg)		t	P-value
	Group B (n = 55)	Group I (n = 55)		
Pre insertion	129.50 ± 10.61	127.67 ± 12.94	0.766	0.445
Post insertion - 1 min	131.08 ± 11.76	125.12 ± 9.62	2.628	0.010
Post insertion - 3 min	127.42 ± 15.58	114.96 ± 12.13	4.243	0.000
Post insertion - 5 min	127.95 ± 20.79	112.39 ± 13.45	4.278	0.000

placed in a supine position with the head in a neutral position. Then given propofol 2–2.5 mg/kg IV and vecuronium 0.08–0.12 mg/kg IV in both groups. Baska mask was introduced into Group B, while i-gel was inserted into Group I.

Measurements were taken of heart rate, oxygen saturation, diastolic and systolic blood pressure, mean arterial pressure, baseline, and post-insertion at 1, 3, and 5 min. In both groups, the length of time needed for insertion and the number of attempts were noted.

Utilizing the resulting data, the effectiveness and disadvantages of using these supraglottic devices were compared and evaluated. The final results were examined using descriptive statistics.

2.3. Statistical analysis

The data was examined at preliminary stages for existence of any noticeable incorporated confounders. Post hoc analysis was not endeavored so as to certify data quality with negligible errors. And data was sent for statistical analysis with SPSS software.

3. RESULTS

Table 1 shows the comparative demographic data of two groups, including ASA grades, mean ages, mean height, weight, I and BMI in Group B and Group I. Both groups were equivalent with no statistical differences.

Table 2 shows comparative mean HR (per min) in Group B and Group I. Significant statistical differences were

Time	DBP (mmHg)		t	P-value
	Group B (n = 55)	Group I (n = 55)		
Pre insertion	84.33 ± 9.56	81.91 ± 9.54	2.683	0.089
Post insertion - 1 min	81.68 ± 10.45	80.57 ± 8.02	0.570	0.570
Post insertion - 3 min	78.87 ± 11.58	75.33 ± 8.16	1.690	0.095
Post insertion - 5 min	78.58 ± 10.86	74.06 ± 7.59	2.312	0.023

Time	MAP (mmHg)		t	P- value
	Group B (n = 55)	Group I (n = 55)		
Pre insertion	97.38 ± 7.18	95.16 ± 9.60	2.457	0.116
Post insertion at 1 min	95.63 ± 17.29	95.00 ± 7.62	0.231	0.818
Post insertion at 3 min	92.62 ± 18.29	88.54 ± 7.35	1.447	0.151
Post insertion at 5 min	92.60 ± 19.05	86.85 ± 7.25	1.980	0.051

Variable	Group B (n = 55)	Group I (n = 55)	t	P- value
Insertion time (sec)	20.17 ± 4.51	15.45 ± 4.70	5.06	< 0.001
No of attempts for insertion				
• 1	32 (58.18)	44 (80.00)	6.14*	0.047
• 2	15 (27.27)	7 (12.73)		
• Failed	8 (14.55)	4 (7.27)		
* Chi Sq				

Complications	Group B (n = 55)	Group I (n = 55)	OR (95% CI)	P-value
Cough	2 (3.64)	1 (1.82)	2.04 (0.18-23.17)	1.00
Sign of regurgitation	0 (0.00)	0 (0.00)	-	-
Sign of aspiration	0 (0.00)	0 (0.00)	-	-
Trauma	1 (1.82)	3 (5.45)	0.32 (0.03-3.21)	0.618
Blood stain	10 (18.18)	7 (12.73)	1.52 (0.53-4.35)	0.599
Dysphagia	0 (0.00)	0 (0.00)	-	-
Sore throat	0 (0.00)	0 (0.00)	-	-

found at pre-insertion, at one min and at 3- and 5-min post-insertion ($P < 0.05$), being higher in Group B.

Table 3 shows comparative mean SBP (mmHg) in Group B and Group I, at pre-insertion, post-insertion at one min,

at 3 min and at 5 min. Significant statistical differences were found at pre-insertion, at one min and at 3- and 5-min post-insertion ($P < 0.05$), being higher in Group B. Table 4 shows comparative mean DBP (mmHg) in

Group B and Group I, pre-insertion, post-insertion at one min, at 3 min and at 5 min. Significant statistical differences were found at 5 min post-insertion ($P < 0.05$), being higher in Group B; at all other points there was no difference.

Table 5 shows comparative mean MAP (mmHg) of Group B and Group I, pre-insertion, post-insertion at one min, at 3 min and at 5 min. At all recording times, MAP was higher in Group B as compared to Group I; the differences being statistically significant.

Table 6 shows comparative mean insertion time was significantly more in Group B as compared to Group I ($P < 0.001$). Regarding mean number of insertion attempts between Group B and Group I, the percentages of one attempt (58.18% vs 80.00%; $P = 0.089$); 2 attempts and failed insertion attempts were 58.18%, 27.27% and 14.55% in Group B and 80.00%, 12.73% and 7.27% in Group I, respectively.

Complications

The frequency of cough was observed in 2 (3.64% vs. 1 (1.82%) patients in Group B compared to Group I ($P = 1.00$). Signs of gastric reflux, signs of aspiration, dysphagia and sore throat were not noticed in any of the patient. The frequency of trauma (1.82% vs 5.45%; $P = 0.618$), and device blood staining (18% vs 12.73%; $P = 0.599$) were statistically equivalent in both of the groups.

4. DISCUSSION

Contemporary supraglottic airway devices, e.g., i-gel and Baska mask, were made to be easily introduced and to preserve hemodynamic stability while under anesthesia. Both devices provide quick and easy insertion techniques that lower the risk of problems and guarantee stable hemodynamics, making them valuable tools for airway control during anesthesia.

In 2019, Sachidananda et al.¹ demonstrated the average insertion time for i-gel was 29.53 ± 08.23 sec. The difference in mean time for insertion of the Baska mask and i-gel (Jain et al.)⁷ was 17.45 ± 3.66 sec, which is statistically significant, although it did not have an important impact on clinical outcomes.

In their investigation, Ozlem Sezen et al.⁸ discovered that the insertion time in the Baska group was 27.97 ± 12.97 sec; whereas, it was 12.73 ± 2.01 sec in the i-gel group.⁵ Similar outcomes were observed in the research conducted by Sachidananda et al.¹, which examined the application of Baska mask and i-gel for minor surgical procedures performed under general anesthesia. Compared to i-gel (14.7 ± 4.4 sec), the Baska mask took somewhat longer to insert (14.9 ± 6.2 sec).

According to Khare et al. (2022), a Blockbuster LMA was inserted in an average of 24.30 ± 3.91 sec, while it took an average of 29.50 ± 12.75 sec to insert i-gel.⁹ The average device insertion time was discovered to differ significantly ($P < 0.0001$). In our research, the i-gel group's success rate (92.73%) was noticeably higher than the Baska mask group (85.45%).

As per Jain et al.¹⁰ For the Baska mask and i-gel groups, the first and second attempt success rates were 35/3 and 38/2, respectively. According to a study by Alexie v et al.,¹¹ inserting a Baska mask in low-risk female patients is more difficult, involves more insertion attempts, and takes longer than inserting an i-gel. The first-time success rate for i-gel was 23/25 (92%), whereas the successful insertion in first-time for Baska mask was 21/24 (87.5%), according to the study by Sachidananda et al. (2019)¹.

The success percentage in the first attempt with the Baska mask was not as high as for the classic LMA (73% versus 98%), according to Alexie v et al.¹² Other researchers, however, have reported a 100% overall success rate. The Baska mask and ProSeal laryngeal mask were compared in the study by Al-Rawahi et al.¹³ The mean insertion time of the Baska mask was significantly less than that of the ProSeal laryngeal mask (16.43 ± 4.54 sec vs. 21.45 ± 6.13 sec). Compared to i-gel, Baska mask had greater first-attempt success rates (90% vs. 83.3%) according to Aziz et al.¹⁴ This was not the case with our study.

Since there aren't many studies on Baska mask, more research is required. Baska and i-gel devices produced comparable intraoperative hemodynamics, as demonstrated by Fotedar et al.¹⁵ However, Ozlem Sezen et al. revealed a substantial difference in heart rate and mean arterial pressure that was in favor of i-gel.⁸ The mean arterial pressure and heart rate of the two groups did not significantly alter following device implantation.²

In our Group B, blood staining accounted for approximately 18.1% of post-operative complications, with cough accounting for 3.6% and trauma for 1.8% of cases. While Group I had a reduced overall complication rate, with blood stain accounting for 12.7% of cases, trauma accounting for 5.4%, and cough accounting for 1.82% of patients. The lack of a significant difference in postoperative complications across the groups was in line with Sachidananda et al.¹ Three patients in group B (12.5%) experienced sore throats during the postoperative period; one of them had a history of dry cough. Before surgery, a dry cough might have negative effects on the respiratory system, like sore throats. In my group, not a single patient had a sore throat. It is therefore assumed that Baska mask is unlikely to injure or stimulate the nearby tissue compared to i-gel.

Additionally, Brimacombe et al.¹⁶ found in a comparison of the LMA with the face mask that the use of larger cuff volumes was associated with a significantly higher number of problems, including throat irritation, the larger the LMA cuff volume. This indicates that the amount of air blown in, not the size of the cuff, is the cause of problems like sore throats.

5. CONCLUSION

We conclude that the number of attempts and insertion time for the Baska mask were significantly higher than those for the i-gel. Before and after insertion, there was no discernible difference in the hemodynamic parameter between the two groups. Additionally, using a Baska mask was associated with a relatively greater likelihood of complications. Furthermore, operator proficiency, contextual needs, and clinical judgement must all play a role in the exact choice of the best supraglottic airway device.

7. Data availability

The numerical data generated during the conduct of this study is available with the corresponding author.

8. Conflict of interest

The authors declare no conflicts of interest.

9. Funding

There was no funding for this particular research.

10. Author's Contributions

AG: Concepts, Design, Guarantor, Literature search, Clinical studies, Data acquisition, Manuscript preparation, Manuscript review

KR: Concepts, , Clinical studies, Data acquisition, , Manuscript editing

ALK, AP: Literature search, Manuscript preparation, Manuscript review

RS: Concept. literature search, Manuscript editing, Manuscript review

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