



A COMPARATIVE EVALUATION OF I-GEL AND BASKA MASK IN PATIENTS UNDERGOING ENT SURGERIES

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ABSTRACT

Background: Airway management is vital in anesthesia, with supraglottic airway devices (SADs) emerging as preferred alternatives to endotracheal intubation due to their ease of use and reduced postoperative complications. The Baska Mask and I-Gel represent advanced generations of SADs, offering distinct features that enhance airway management during surgeries, particularly in challenging settings like ENT procedures. **Aims & Objectives:** This study aims to compare the efficacy of the Baska Mask and I-Gel in maintaining stable hemodynamic parameters and effective ventilatory outcomes during ENT surgeries. The primary objective was to evaluate the hemodynamic stability and Leak fraction of both devices. **Methods:** A prospective observational study was conducted at Nehru Hospital, B.R.D. Medical College, Gorakhpur, from May 2023 to April 2024. A total of 80 adult patients (ASA I or II) undergoing elective ENT surgeries were randomized into two groups: 40 received the Baska Mask and 40 received the I-Gel. Hemodynamic parameters (HR, SBP, DBP, MAP) and ventilatory outcomes (Vinsp, Vexp, leak fraction) were recorded perioperatively. Postoperative complications, including sore throat and SAD staining, were documented. Data were analyzed using SPSS v28.0 with appropriate statistical tests. **Results:** Both groups showed no significant differences in hemodynamic parameters across all time points. The Mean leak fraction was found to be significantly lower in the Baska group as compared to the I-Gel group, suggesting better seal of Baska group. The incidence of postoperative sore throat was slightly higher in the I-Gel group compared to the Baska group. Blood-stained SADs were marginally more common in the Baska group as compared to the I-Gel group. **Conclusions:** The Baska Mask and I-Gel are equally safe and effective for airway management in ENT surgeries, with no significant differences in hemodynamic stability and postoperative complications. These findings support the use of either device however Baska mask has slight edge over I-Gel as for as seal is concern.

KEYWORDS

Airway management, Supraglottic airway device, Baska Mask, I-Gel, ENT surgery, Leak fraction, Hemodynamic stability.

INTRODUCTION

Airway management is crucial in anesthesia, with endotracheal intubation traditionally seen as the gold standard.¹ However, its invasiveness can lead to adverse hemodynamic effects like hypertension and tachycardia, prompting the development of less invasive alternatives. Supraglottic airway devices (SADs) have emerged as a popular choice, offering ease of use, reduced need for muscle relaxants, and fewer postoperative issues like sore throat and coughing.^{2,3}

SADs have evolved through generations, each with improved features. First-generation devices like the classic LMA provided basic airway management but lacked protective mechanisms. The second generation, including the Proseal-LMA and I-GEL, introduced enhancements like gastric drainage channels. The I-GEL, known for its non-inflatable, gel-like cuff, offers a secure seal around the airway with less risk of tissue trauma and includes a gastric port for added protection against aspiration.⁴

The third-generation BASKA mask further advances SAD technology.⁵ It features a self-sealing cuff that adapts to airway pressures, ensuring a tight seal during positive pressure ventilation. Its sophisticated gastric drainage system efficiently handles reflux, making it particularly suited for procedures where the patient's position frequently changes, such as ENT surgeries.⁶

In ENT surgeries, effective airway management is challenging due to the constant repositioning of the head and neck, which can disrupt the airway seal. Both the I-GEL and BASKA mask are designed to maintain a consistent seal under these conditions, but direct comparisons in ENT settings are limited.⁷

This study aims to fill that gap by comparing the performance of the I-

GEL and BASKA mask in ENT surgeries. Focusing on leak fraction and hemodynamic stability.

MATERIALS AND METHODS

This prospective observational study was conducted at Nehru Hospital, B.R.D. Medical College, Gorakhpur, between May 2023 and April 2024. After obtaining approval from the ethical committee and securing informed written consent from all participants, involving 80 adult patients of both sex, aged 18 to 60 years, ASA Physical Status I or II and Patients scheduled for elective ENT surgeries with an anticipated duration of less than 3 hours. Patients were randomized into two groups: 40 in Group I (I-GEL) and 40 in Group B (BASKA mask).

Upon arrival in the operating room, each patient had an 18G intravenous line secured, and standard monitoring devices including Non-invasive BP, ECG, pulse oximetry (SpO₂) and end-tidal CO₂ (EtCO₂) were applied and baseline vital signs were recorded. Premedication consisting of glycopyrrolate at a dose of 0.004 mg/kg, Midazolam at 0.05 mg/kg and fentanyl at 2 µg/kg was administered to all patients. Anaesthesia induction began with propofol at 2 mg/kg and vecuronium at 0.1 mg/kg. Subsequently, airway management was performed using either the assigned I-GEL or BASKA mask.

Hemodynamic parameters, including Systolic BP, Diastolic BP, Mean Arterial Pressure and Heart Rate were recorded both before and after insertion of the supraglottic device (I-GEL or BASKA mask). Following device insertion, ventilatory parameters (Tidal Volume inspired, Tidal Volume expired, Leak Fraction) and hemodynamic parameters (SBP, DBP, MAP, HR) were systematically documented every 10 minutes until end of the surgery using automated recording methods on a multichannel monitor.

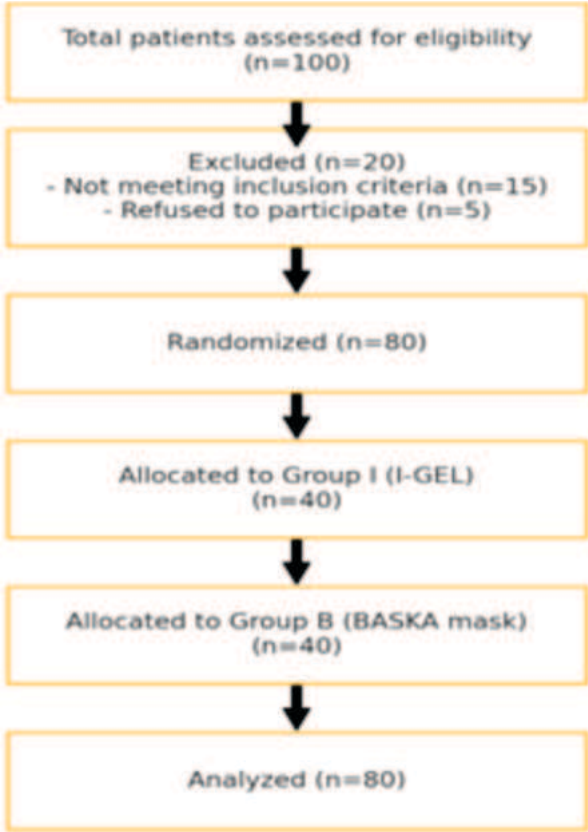
Supraglottic devices were inserted, with a maximum of three attempts.

In instances where supraglottic device insertion failed after three attempts, immediate tracheal intubation was performed to ensure airway patency and patient safety.

Anaesthesia was maintained using a mixture of oxygen (33%) and nitrous oxide (67%), supplemented with isoflurane (0.8-1.5%) and periodic top-ups of vecuronium to maintain muscle relaxation. Respiratory settings were standardized with an inspired tidal volume set at 6-8 ml/kg and an inspiratory/expiratory ratio of 1:2. The respiratory rate was adjusted b/w 14 to16 ensuring adequate ventilation. Oxygen saturation (SpO2) was monitored continuously and maintained above 97% throughout the procedure.

Following completion of surgery, reversal of neuromuscular blockade was achieved with injection neostigmine (0.05 mg/kg) and injection glycopyrrolate (0.01 mg/kg) once the patient exhibited sufficient recovery of muscle function

Data were analyzed using SPSS v28.0, employing unpaired t-tests, and Mann-Whitney U tests to compare outcomes between the two groups. The study ensured consistent monitoring and documentation to optimize patient safety and surgical outcomes.



Variable	after insertion of SGD	after 10 min	after 20 min	after 30 min	after 40 min	after 50 min	after 60 min	after 70 min	after 80 min	after 90 min	after 100 min	after 110 min	after 120 min
Vinsp Baska Group (Mean ± SD)	408 ± 35.7	408 ± 35.7	408 ± 35.7	408 ± 35.7	408 ± 35.7	407 ± 36.1	407 ± 36.1	405 ± 35.3	406 ± 36.3	404 ± 37.4	410 ± 41.6	410 ± 29.3	410 ± 14.1
Vinsp I-Gel Group (Mean ± SD)	413 ± 32.7	413 ± 32.7	413 ± 32.7	413 ± 32.7	413 ± 32.7	413 ± 32.7	414 ± 33.0	412 ± 32.6	414 ± 34.0	413 ± 35.8	420 ± 37.9	420 ± 44.2	420 ± 42.4
Vexp Baska Group (Mean ± SD)	356 ± 26.9	363 ± 28.3	366 ± 28.7	370 ± 29.3	375 ± 30.5	378 ± 31.1	380 ± 31.8	378 ± 31.0	381 ± 31.9	382 ± 33.5	387 ± 36.2	393 ± 35.7	393 ± 10.6
Vexp I-Gel Group (Mean ± SD)	357 ± 35.1	367 ± 34.3	371 ± 34.1	373 ± 33.3	376 ± 33.6	382 ± 32.6	383 ± 34.8	385 ± 33.2	385 ± 34.7	386 ± 36.6	394 ± 40.0	396 ± 44.8	400 ± 38.9
Leak Fraction Baska Group (Mean ± SD)	12.48 ± 5.06	11.01 ± 4.59	10.28 ± 4.06	8.98 ± 3.62	8.09 ± 3.08	7.03 ± 2.51	6.62 ± 2.27	6.08 ± 1.91	6.32 ± 1.99	5.66 ± 2.17	5.54 ± 2.01	4.15 ± 2.53	4.63 ± 0.18
Leak Fraction I-Gel Group (Mean ± SD)	13.72 ± 4.6	11.40 ± 4.70	10.73 ± 4.58	9.38 ± 3.47	8.76 ± 3.67	7.55 ± 2.82	7.38 ± 2.42	6.66 ± 2.18	6.73 ± 1.59	6.65 ± 1.90	6.18 ± 1.63	5.71 ± 1.31	4.76 ± 1.02

RESULTS
Table 1 Hemodynamic Parameters Of Baska And I-gel Groups Across Time Points
Hemodynamic parameters of the Baska and I-Gel groups across various time points demonstrate comparable trends in heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), and mean arterial pressure (MAP) over time, with no significant difference observed between the groups at any time point.



Table 2 Ventilatory Parameters between Baska and I-Gel Groups across Time point
The study compares the mean values of inspired and expired tidal volumes (Vinsp and Vexp) between the Baska and I-Gel groups at various time intervals and found to be statistically not significant. Although the leak fraction differences observed between the two groups were found to be statistically significant across most time points.

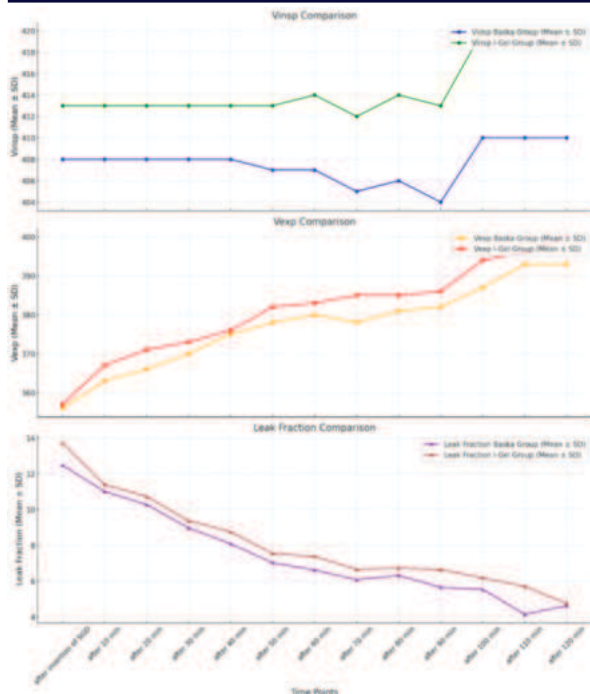
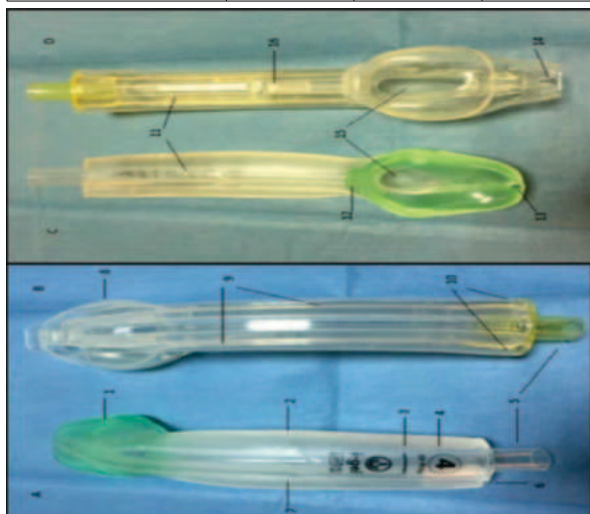


Table 3 Postoperative Complications and Removal SAD Staining in Baska and I-Gel Groups

Postoperative complications (cough, sore throat, dysphagia, dyspnea) and presence of staining (blood/vomitus/bile) on the removed supraglottic airway devices (SAD) were compared between the Baska and I-Gel groups. The incidence of postoperative sore throat was slightly higher in the I-Gel group compared to the Baska group, although the majority of patients in both groups reported no complications. Similarly, the percentage of blood-stained SADs was slightly higher in the Baska group, but the overall difference between the two groups was minimal.

Post Op Complications/ Removal SAD Staining	Baska Mask Group (n=40)	I-Gel Group (n=40)	Total (n=80)
NIL (Post Op Complications)	38 (95.0%)	36 (90.0%)	74 (92.5%)
Sore Throat	2 (5.0%)	4 (10.0%)	6 (7.5%)
NIL (Removal SAD Stained)	35 (87.5%)	36 (90.0%)	71 (88.75%)
Blood Stained	5 (12.5%)	4 (10.0%)	9 (11.25%)



The structural features of the I-gel® airway (A, C) and Baska® mask (B, D) are compared in figure 1. The I-gel® has a non-inflatable soft gel cuff (1), buccal cavity stabilizer (2), depth insertion guide (3), and gastric channel (6, 7). The Baska® mask features a cuffless membranous bowl (8), dual gastric channels (9), and openings to the atmosphere (10). Both masks have a standard connector (5) and airway orifice (15). The I-gel® includes an epiglottic rest (12), while the

Baska® mask has an integral bite block (11) and insertion tab (16) for easier placement.

DISCUSSION

In our study hemodynamic parameters (mean heart rate, SBP, DBP, MAP) were comparable between both the study groups and it was found that no significant difference seen from the preoperative period to end of surgery in between the two groups. In a similar study was conducted by So Ron Choi et al (2019), they also found no significant difference in Hemodynamic parameters between the two groups at various time points.

The mean Vinsp and Vexp in between both study groups from pre-operative period to end of surgery remained comparable and no significant statistical difference was found. Sinasamy et al, in (2020) observed no significant differences in Vinsp and Vexp between the two groups, the trends aligning closely with our study's results.

In our study mean leak fraction between both groups cross all time points showed statistically significant differences in leak fractions between the two group (Leak fraction being lower in Baska group as compared to I-Gel group)(Table no:2). Chaudhary UK et al, in (2018) did a similar study on comparative analysis of the Baska mask versus I-Gel for general anaesthesia in surgical patients undergoing laparoscopic cholecystectomy. They also found that the oropharyngeal leak fraction was significantly lesser leak in Baska mask may contribute to a better seal with less operative room pollution.

There were no major complications observed in both the study groups except sore throat (5% in Baska gp and 10% in I-Gel gp) and SAD stained with blood (12.5% in Baska gp and 10% in I-Gel gp) which was statistically non-significant. A similar study conducted by Sezen et al (2019) and Chaudhary UK et al (2018) and found no statistically significant difference in both study groups.

The overall findings suggest that both the Baska Mask and I-Gel devices are effective and safe for use in airway management during ENT surgical procedures. The lack of significant differences in Hemodynamic stability, postoperative complications, SAD removal outcomes, and insertion times & attempt implies that both devices can be used interchangeably based on the specific needs of the patient or the preferences of the clinician. The slightly lower incidence of sore throat in the Baska Mask group and the trend towards faster insertion times with the I-Gel may influence device choice in certain clinical situations.

CONCLUSION

In conclusion no significant difference seen between the Baska Mask and I-Gel groups in terms of hemodynamic parameters and mean insertion time for device insertion. The Mean leak fraction was found to be significantly lower in the Baska group as compared to the I-Gel group, suggesting better seal and thus lesser chances of perioperative risk of aspiration in respiratory tract. Postoperative complications incidence of sore throat were slightly higher in the I-Gel group and a marginally higher rate of blood-stained SADs in the Baska group. Overall, the Baska Mask provide slightly better seal and less postoperative complications as compared to I-Gel.

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Ethical Approval: As per international standards or university standards written ethical permission has been collected and preserved by the author(s).

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