Section: Anaesthesia

Original Research Article

COMPARISON OF BASKA LARYNGEAL MASK AIRWAY AND ENDOTRACHEAL TUBE IN ADULT PATIENTS UNDERGOING SURGERY UNDER GENERAL ANAESTHESIA: A RANDOMISED STUDY

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ABSTRACT

Background: Airway management is a critical component of general anaesthesia. Although endotracheal tube (ETT) intubation provides a definitive airway, it is associated with airway stimulation and hemodynamic responses. The Baska laryngeal mask airway, a third-generation supraglottic airway device, has been developed to provide effective ventilation with reduced airway stimulation. This study aimed to compare the Baska laryngeal mask airway with endotracheal intubation in adult patients undergoing elective surgery under general anaesthesia. **Materials and Methods:** This prospective randomised study included 100 adult patients (ASA physical status I–III) scheduled for elective surgeries lasting 1–1.5 hours under general anaesthesia. Patients were randomly allocated to Group B (Baska mask, n = 50) or Group E (endotracheal tube, n = 50). Outcomes assessed included airway device insertion time, ease and number of insertion attempts, intraoperative hemodynamic parameters (heart rate, systolic, diastolic, and mean arterial pressure), and postoperative airway complications. **Result:** Demographic characteristics were comparable between the groups (mean age: 37 ± 12.6 years in Group B vs. 39.4 ± 11.3 years in Group E; p = 0.318). Mean insertion time was significantly shorter with the Baska mask compared with ETT (12.9 ± 3.3 s vs. 15.3 ± 4.4 s; p = 0.0026). First-attempt success rates were similar between the groups (96% in Group B vs. 92% in Group E; p = 0.40). Heart rate and blood pressure values were comparable at most intraoperative time points; however, during airway insertion and the immediate post-insertion period, significantly higher heart rate and systolic, diastolic, and mean arterial pressure values were observed in Group E ($p < 0.05$). Postoperative airway complications were infrequent and did not differ significantly between the groups. **Conclusion:** The Baska laryngeal mask airway is a safe and effective alternative to endotracheal intubation, with comparable postoperative airway morbidity, in adult patients undergoing routine elective surgeries under general anaesthesia.

INTRODUCTION

Airway management is a basic factor of general anaesthesia to confirm adequate oxygenation, ventilation, and protection against aspiration. In the past, endotracheal intubation has been the gold standard for securing the airway because of its ability to provide a definitive seal and reliable ventilation in a wide variety of clinical situations.[1] However, laryngoscopy and tracheal intubation are well known to cause sympathetic irritation, often resulting in tachycardia and hypertension, which may be hard for patients with cardiovascular, neurological, or metabolic comorbidities. Postoperative airway morbidities, including sore throat, hoarseness of voice, dysphagia, and cough, are also some of the common patient complaints following endotracheal tube (ETT) use, affecting overall perioperative comfort and satisfaction.[2] However, the introduction of supraglottic airway devices (SADs) has changed or revolutionised modern airway management practices. Since Dr. Archie Brain introduced the first Laryngeal Mask Airway (LMA) in 1983, later generations of SADs have provided anaesthesiologists with safer and more efficient alternatives to ETT in selected patients.[3]

SADs are associated with easier insertion, reduced airway manipulation, improved hemodynamic

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stability, decreased intraocular and intracranial pressure responses, and faster recovery profiles. However, first- and second-generation devices had limitations, particularly in achieving high oropharyngeal leak pressures (OLP) and in providing adequate protection against gastric regurgitation during positive pressure ventilation.[4] To address these problems, advanced third-generation devices were developed, including the Baska Mask. The Baska Mask includes a self-sealing membranous cuff that dynamically adjusts to airway pressure, dual drainage channels for effective gastric content clearance, an integrated bite block, and an insertion tab to help positioning.[5]

Unlike the older cuffed devices, the Baska Mask does not require inflation, reducing risks of mucosal ischemia and nerve injury. Its ability to achieve high sealing pressures makes it useful in cases requiring controlled ventilation. These design characteristics suggest potential advantages in terms of smoother insertion, improved hemodynamic stability, superior airway sealing, and reduced postoperative pharyngolaryngeal morbidity.[6] Hemodynamic response during airway instrumentation is important because sudden cardiovascular changes may cause ischemic events or stress-related complications.[7] Since SADs avoid direct stimulation of the larynx and trachea, the Baska Mask is expected to reduce the sympathetic response compared to ETT. Their ease and quick insertion maintain oxygenation during induction, minimise operator fatigue and provide a reliable airway management in time-sensitive situations.[8]

Although several studies have evaluated the performance of various SADs, studies directly comparing the Baska Mask with endotracheal intubation are still limited. Comparative analysis of these techniques strengthens decision-making of the clinicians by identifying whether the Baska Mask can serve as a reliable and be a better alternative to endotracheal intubation in suitable patients. Therefore, this study aims to compare various perioperative parameters between the Baska laryngeal mask airway and the ETT in adult patients undergoing elective surgeries under general anaesthesia. It evaluates and compares hemodynamic stability, insertion time, and ease of insertion between the two airway devices, while also assessing the incidence of postoperative complications to determine which device offers better clinical performance and patient comfort.

MATERIALS AND METHODS

This prospective, randomised, intergroup comparative study was conducted in the Department of Anaesthesiology at Karpaga Vinayaga Institute of Medical Sciences and Research Centre, Chengalpattu, Tamil Nadu, over a 12-month period from September 2022 to August 2023. Institutional Ethics Committee approval was obtained prior to initiating the study (IEC No: ___), and written informed consent was obtained from all participants.

Inclusion and exclusion criteria

Patients aged 18–60 years of either gender who were scheduled for elective surgical procedures lasting 1–1.5 hours under general anaesthesia and classified as ASA physical status I to III were included. Patients who refused participation, were identified to have an anticipated difficult airway during preoperative assessment, were obese, or had significant systemic comorbidities were excluded.

Sample size calculation

Sample size was calculated based on the formula;

$$n = \frac{Z^2_{1-\frac{\alpha}{2}} p(1-p)}{d^2}$$

Using a 95% confidence interval and a precision of 5%, the minimum sample size required was 99–100 subjects. Hence, a total of 100 patients were included in the study.

Methods: The study included 100 patients scheduled for elective surgeries under general anaesthesia who were randomly allocated into two; Group B (Baska Mask, n = 50) and Group E (Endotracheal Tube, n = 50). Randomisation was performed using a computer-generated random number sequence, and allocation concealment was ensured using sealed opaque envelopes. All patients underwent a detailed preoperative assessment during which the procedure and postoperative evaluation were explained, including a questionnaire for sore throat and hoarseness of voice. Sore throat was defined as persistent throat discomfort irrespective of swallowing. Hoarseness was defined as an abnormal change in voice accompanied by dryness or scratchiness. Patients were instructed to fast overnight and were given alprazolam 0.5 mg at 6 am on the day of surgery with sips of water for anxiolysis. In the operating room, an intravenous line was secured, and standard ASA monitors, including NIBP, ECG, pulse oximetry, and capnography, were applied, with baseline parameters recorded.

Before insertion, the Baska mask's integrity was checked by occluding both the airway opening and mask head and squeezing the reservoir bag for 5–6 seconds to confirm the absence of leaks; the device was then lubricated with water-based lignocaine gel. Insertion time for the Baska mask was measured from the moment the device was picked up until the appearance of the first capnograph trace, while insertion time for endotracheal intubation was recorded from initiation of direct laryngoscopy to the first capnographic trace. Anaesthesia induction consisted of intravenous midazolam (0.02–0.03 mg/kg), glycopyrrolate (0.005 mg/kg), fentanyl (1–2 µg/kg), propofol (1.5–2.5 mg/kg), and vecuronium (0.08–0.1 mg/kg) to facilitate airway insertion. In Group B, size 3 Baska masks were used for females and size 4 for males; in Group E, endotracheal tubes sized 7.0–7.5 mm (females) and 8.0–8.5 mm (males) were used. Device placement was confirmed by

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bilateral equal chest rise, auscultation of air entry, square-wave capnography, expired tidal volume > 8 ml/kg, and absence of audible leak. Anaesthesia was maintained with oxygen, nitrous oxide, sevoflurane, and supplemental vecuronium as required. At the end of surgery, neuromuscular blockade was reversed using neostigmine 0.05 mg/kg and glycopyrrolate 0.01 mg/kg, and once the patient regained consciousness and respond verbal commands, the airway device was removed. Any blood staining on the device, and intraoperative or emergence complications such as bronchospasm, laryngospasm, regurgitation, or aspiration, were documented. In the postoperative period, patients were evaluated for sore throat, hoarseness of voice, and coughing using the predefined criteria before being transferred for recovery monitoring. Postoperative airway assessments were performed in the recovery room within the first postoperative hour.

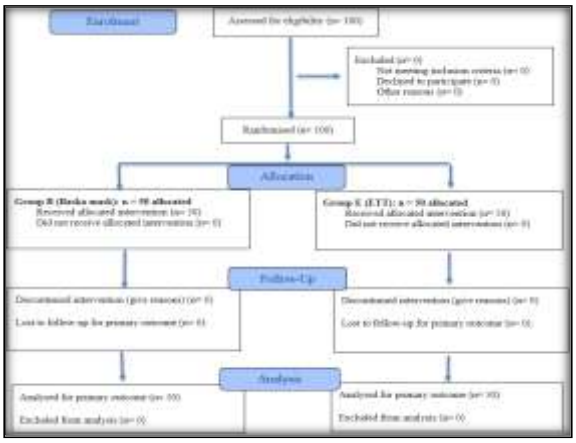

Figure 1: Consort flow diagram

The primary outcomes were airway device insertion time and hemodynamic parameters (heart rate, systolic, diastolic, and mean arterial pressure) during and after airway insertion. Secondary outcomes included ease of insertion, number of insertion attempts, and incidence of postoperative airway complications such as sore throat, hoarseness of voice, coughing, and blood staining of the device.

Statistical analysis: Data were analysed using SPSS software (version 26). Continuous variables were expressed as mean ± standard deviation and compared using the independent Student's t-test. Categorical variables were analysed using the chi-square test or Fisher's exact test as appropriate. A p-value < 0.05 was considered statistically significant.

RESULTS

The mean age was 37 ± 12.6 years in Group B and 39.4 ± 11.3 years in Group E (p = 0.318). Average height (1.657 ± 0.11 m vs. 1.670 ± 0.098 m; p = 0.53), weight (64.2 ± 8.4 kg vs. 65.7 ± 8.6 kg; p = 0.38), and BMI (22.7 ± 2.5 kg/m² vs. 23.1 ± 2.0 kg/m²; p = 0.38) were also similar between the groups. Male participants constituted the majority in both groups with 80% in Group B and 84% in Group E (p = 0.6) [Table 1].

The mean duration of surgery in group B was 75.8 ± 7.2 minutes and in group E 73.5 ±4.8 minutes (p = 0.063). The duration of device insertion was shorter in group B compared to group E (12.9 ± 3.3 vs. 15.3 ± 4.4 seconds, p = 0.0026). Ease of insertion was comparable between groups, with no significant difference (p = 0.153). Successful insertion on the first attempt occurred in 48 patients in group B and 46 in group E. The incidence of airway-related complications did not differ significantly between the groups (p > 0.05) [Table 2].

Table 1: Demographic profile

Variable		Group B	Group E	p-value
Age (years)		37 ± 12.6	39.4 ± 11.3	0.318
Height (m)		1.657 ± 0.11	1.670 ± 0.098	0.53
Weight (kg)		64.2 ± 8.4	65.7 ± 8.6	0.38
BMI (kg/m²)		22.7 ± 2.5	23.1 ± 2.0	0.38
Gender	Male	40 (80%)	42 (84%)	0.6
	Female	10 (20%)	8 (16%)	

Table 2: Surgical and complication characteristics

Parameter		Group B	Group E	p-value
Duration of surgery (min)		75.8 ± 7.2	73.5 ± 4.8	0.063
Duration of insertion (sec)		12.9 ± 3.3	15.3 ± 4.4	0.0026
Ease of insertion	Easy	42	34	0.153
	Fair	7	15	
	Difficult	1	1	
Attempts for success	1st attempt	48	46	0.4
	2 attempts	2	4	
Complications	Cough	1	3	0.307
	Sore throat	3	4	0.695
	Hoarseness	1	2	0.557
	Blood-stained device (post-extubation finding)	2	4	0.4
	Laryngospasm, Postoperative aspiration, Regurgitation, Soft tissue trauma	0	2	-

These complications were rare and not subjected to statistical testing due to low event numbers.

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The differences in heart rate between the two groups were insignificant at most time points. However, at 1, 3, and 5 minutes after insertion, Group E showed significantly higher heart rates compared to Group B ($p < 0.05$) [Figure 2].

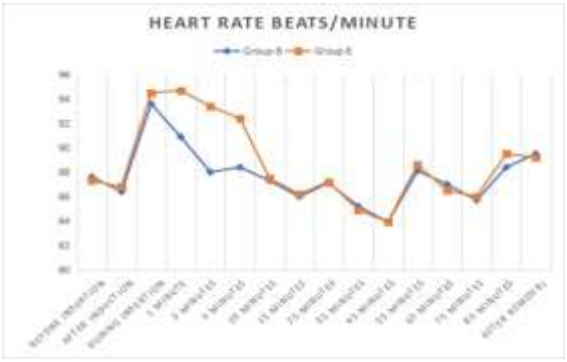

Figure 2: Distribution of heart rates

There were no significant differences in systolic blood pressure (SBP) between the groups at most time points. However, during insertion and in the initial period after insertion (at 1 and 3 minutes), Group E showed significantly higher SBP compared to Group B ($p < 0.05$) [Figure 3].

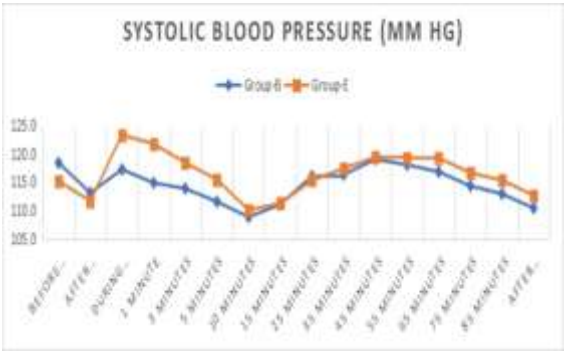

Figure 3: Distribution of SBP

At most intraoperative time points, no significant differences in diastolic blood pressure (DBP) were observed between the two groups based on the p-values. However, during insertion and in the initial period after insertion (at 1, 3, and 5 minutes), Group E showed significantly higher DBP compared to Group B ($p < 0.05$) [Figure 4].

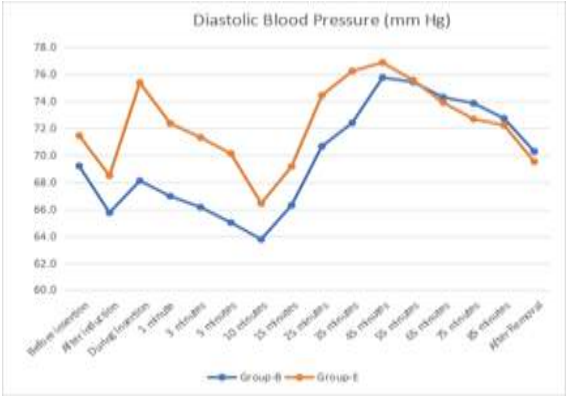

Figure 4: Distribution of DBP

At most intraoperative time points, no significant differences in mean arterial pressure (MAP) were observed between the groups. However, during insertion and in the initial period after insertion (at 1, 3, and 5 minutes), Group E showed significantly higher MAP compared to Group B ($p < 0.05$) [Figure 5].

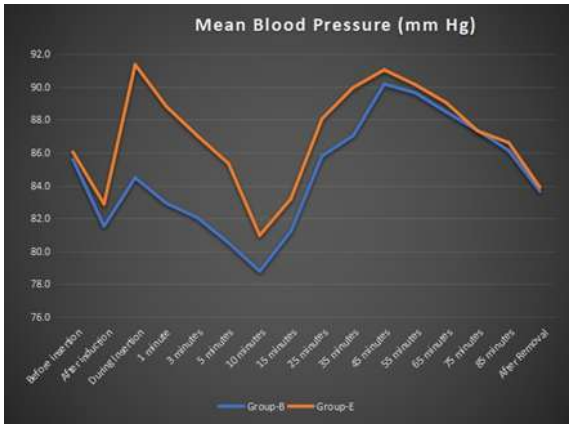

Figure 5: Distribution of MAP

DISCUSSION

This study compared the perioperative performance of the Baska laryngeal mask airway and the ETT with respect to insertion characteristics, hemodynamic responses, and airway-related complications in adult patients undergoing elective surgery under general anaesthesia. The Baska mask was associated with a shorter insertion time and comparable ease of placement, while maintaining effective ventilation comparable to endotracheal intubation. Hemodynamic variables were largely similar between groups throughout the procedure. However, during airway insertion and the immediate post-insertion period, patients in group E showed significantly higher heart rate and blood pressure responses. Postoperative airway morbidity, including sore throat, hoarseness, and cough, was minimal in both groups and showed no significant difference.

The mean age, weight, height and BMI were similar between the groups, but as for the gender, males were predominant in both groups. Tosh et al. reported that the mean age (46.2 ± 9 vs. 46.9 ± 6.5 years), mean weight (80.9 ± 13.9 vs. 76.5 ± 11.8 kg), with no significant differences.9 Choe et al. observed a comparable age (46.8 ± 15.4 vs. 52.5 ± 15.4 years), weight (65.2 ± 13.1 vs. 69.4 ± 13.9 kg) and BMI (25.9 ± 4.1 vs. 26.6 ± 4.4), with a predominance of females (all > 0.05).[10] Mariyappan et al. found that age, weight, and BMI were comparable between groups, with no statistically significant differences, and most participants were female.[11] Thus, the similarity of age, weight and BMI observed in our study is also found in previous studies. However, the difference in the sex of the patients observed across the studies could be due to variation in the type of surgeries included in each study.

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In our study, the mean duration of surgery, ease of insertion and successful insertion on the first attempt were comparable between the groups. However, the duration of device insertion was shorter in group B compared to group E, with a significant difference. Complications were minimal and higher in group E, but not significant. Khetarpal et al. reported that the time taken for Baska mask insertion was 12.8 ± 1.36 s, while it was 15.93 ± 1.51 s for ETT. Baska mask was the easiest for insertion, as it was easy in most cases compared to the ETT (85 vs. 65%).[12] Ahn et al. observed that operation time and device removal time were similar in both groups, but the device insertion time was significantly lower in the Baska group (28.4 ± 10.7 vs. 46.6 ± 19.8 s, p = 0.001).[13] Singhal et al. observed that most of the Baska mask insertions were easy (45 vs. 35), and the Bask group had the least time taken for insertion and the number of attempts for success (45 vs. 35 – success in 1st attempt). Complications were minimal in both groups; however, the ETT group reported the most complications, with no significance.[14] These findings suggest that the Baska mask allows faster insertion with comparable ease of placement, success rates, and complication profiles when compared with endotracheal intubation. Our findings, along with previous studies, support that though both insertions have a similar duration of surgery, the Baska mask is better than ETT as per surgical considerations.

In our study, at most intra-operative time points, heart rate and blood pressure were comparable between the two groups. However, during airway insertion and the immediate post-insertion period, Group E had a significantly higher hemodynamic response compared to Group B. Kuşderci et al. reported that the ETT group had significantly increased hemodynamic parameters during the immediate post-insertion and extubation period.[15] Similarly, Karthik et al. observed that patients of the ETT group experienced significantly increased heart rates ($p < 0.001$) and MAP ($p < 0.05$) during the immediate post-insertion and extubation duration.[16] These findings indicate that using the ETT has a higher risk of causing high hemodynamic stress on the patients, whereas the Baska mask is safe and doesn't trigger any sudden spike in hemodynamic parameters. This difference is likely attributable to direct laryngoscopy and tracheal stimulation associated with endotracheal intubation, which triggers a stronger sympathetic response compared to supraglottic airway placement. Therefore, these findings support the role of the Baska laryngeal mask airway as a feasible alternative to endotracheal intubation for routine elective procedures, particularly where minimising hemodynamic responses is desirable.

Strengths: The strengths of this study include its prospective randomised design, standardised anaesthetic and airway management protocols, and objective measurement of hemodynamic parameters at predefined time points. Inclusion of commonly encountered elective surgical procedures enhances its relevance to routine clinical practice.

Limitations: The study population consisted mostly of healthy adult patients with ASA physical status I–III; therefore, the findings may not be applicable to patients with significant comorbidities, emergency cases, obese patients, or those with difficult airway anatomy. Blinding of the anaesthesiologist was not feasible, and outcomes such as insertion time and ease of insertion may have been influenced. The results are dependent on the skill and experience of the anaesthesiologist performing the airway management, which may limit reproducibility across different settings. Future studies involving larger, multicentric populations, high-risk patients, and emergency surgical settings are needed to further define the role of the Baska mask across diverse clinical scenarios.

CONCLUSION

The Baska mask can serve as an effective alternative to endotracheal intubation for adult patients undergoing routine elective surgeries lasting 1–1.5 hours, providing a satisfactory airway with stable haemodynamics and comparable airway-related morbidity. The Baska mask was associated with a shorter insertion time and lower hemodynamic responses during airway manipulation compared with the endotracheal tube, while providing comparable ventilation and oxygenation.

REFERENCES

1. Alvarado AC, Panakos P. Endotracheal intubation techniques. StatPearls 2025. https://www.ncbi.nlm.nih.gov/books/NBK560730/.
2. Weagraff J, Velazquez G, Tolosa M. Use of esmolol during induction of general anesthesia to reduce opioid drug usage - A review of the current literature and creation of an educational module for anesthesia providers. Ahu.edu 2019. https://repository.ahu.edu/server/api/core/bitstreams/0de59fac-1c27-467b-87b9-a1799e48436c/content#:~:text=A%20review%20of%20the%20literature%20demonstrated%20an,one%20minute%20(Chopra%2C%20Gupta%2C%20&%20Lone%2C%202017).
3. Singh K. Second generation supraglottic airway (SGA) devices. IntechOpen 2021. https://www.intechopen.com/chapters/73593.
4. Zhang K, Zhou M, Zou Z, Zhu C, Jiang R. Supraglottic airway devices: a powerful strategy in airway management. Am J Cancer Res 2024;14:16–32. https://doi.org/10.62347/kjru4855.
5. Gatt S, Zundert T. The Baska Mask -A new concept in Self-sealing membrane cuff extraglottic airway devices, using a sump and two gastric drains: A critical evaluation. J Obstet Anaesth Crit Care 2012;2:23. https://doi.org/10.4103/2249-4472.99313.
6. Kumar Sinasamy T, Nazaruddin Wan Hassan WM, Hardy Mohamad Zaini R, Seevaunnamtum P, Ab Mukmin L. Comparison of the Baska mask and the i-gel supraglottic airway devices in patients undergoing elective surgery. Anaesthesiol Intensive Ther 2020;52:383–8. https://doi.org/10.5114/ait.2020.101407.
7. Kanchi M, Nair HC, Banakal S, Murthy K, Murugesan C. Haemodynamic response to endotracheal intubation in coronary artery disease: Direct versus video laryngoscopy. Indian J Anaesth 2011;55:260–5. https://doi.org/10.4103/0019-5049.82673.
8. Singh DA, Chethanananda D, Jakati DRS, Shetty DS. A comparative study of Baska Mask and ProSeal Laryngeal

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Mask Airway for general anaesthesia with intermittent positive pressure ventilation. Int J Environ Sci 2025:2620–6. https://doi.org/10.64252/nw4zhb39.
9. Tosh P, Kumar RB, Sahay N, Suman S, Bhadani UK. Efficacy of Baska mask as an alternative airway device to endotracheal tube in patients undergoing laparoscopic surgeries under controlled ventilation. J Anaesthesiol Clin Pharmacol 2021;37:419–24. https://doi.org/10.4103/joacp.JOACP_339_19.
10. Choe NC, Sybil Shah MHB, Chaw SH, Mansor MB, Tan WK, Koong JK, et al. Baska mask versus endotracheal tube in laparoscopic cholecystectomy surgery: a prospective randomized trial. Expert Rev Med Devices 2021;18:203–10. https://doi.org/10.1080/17434440.2021.1865796.
11. Mariyappan S, Anjana, Kumar P, Naveena, Appavoo S, Kumar Choudhary A. Comparison of Baska mask versus endotracheal tube for general anesthesia in laparoscopic cholecystectomy: A randomized controlled trial. J Cell Mol Anesth 2024;9. https://doi.org/10.5812/jcma-145475.
12. Khetarpal R, Kumar R, Singh S. Comparison of baska laryngeal mask airway and endotracheal tube in adult patients undergoing surgery under general anesthesia: A prospective randomized study. VHL Regional Portal 2020. https://pesquisa.bvsalud.org/portal/resource/pt/sea-209298. ID: sea-209298
13. Ahn H, Min SK, Park JY, Seo WS, Kim JY. Safety and efficacy of the Baska mask versus endotracheal intubation in 64 women undergoing elective laparoscopic gynecological surgery under general anesthesia: A prospective single-center study. Med Sci Monit 2022;28:e937630. https://doi.org/10.12659/MSM.937630.
14. Singhal R, Deshwal V, Chaudhary V. Baska Supraglottic Airway Device as an Alternative to Conventional Endotracheal Intubation in Patients Undergoing Laparoscopic Surgery. J Adv Med Dent Scie Res 2020;8(6):5-10. https://jamdsr.com/uploadfiles/2Baskamaskvol8issue6pp5-10.20200601070001.pdf.
15. Kuşderci HS, Torun MT, Öterkuş M. Comparison of the Baska Mask® and endotracheal tube on hemodynamic and respiratory parameters in septoplasty cases. Prague Med Rep 2021;122:5–13. https://doi.org/10.14712/23362936.2021.1.
16. Karthik GS, Sudheer R, Priyanka D, Rangalakshmi S, Halima S, Supriya R. Comparison of Baska Mask and conventional endotracheal tube in airway management during laparoscopic cholecystectomy: A randomized clinical study. Ind J Anaesth Analg 2021;8:247–56. https://doi.org/10.21088/ijaa.2349.8471.8221.36.