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Original Research Article

A Prospective Randomized Comparative Evaluation of Ambu Aura-40 & Baska Mask Airway in Adult Patients Undergoing Elective Surgery

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Conflict of interest: Nil

Abstract:

Background: Supraglottic airway devices (SADs) are increasingly used in modern anaesthesia as alternatives to endotracheal intubation. The Ambu Aura40 and Baska Mask are second-generation SADs designed to improve sealing, insertion ease, and patient safety. However, limited comparative evidence exists regarding their performance in elective surgical settings.

Aim and Objectives: The primary objective to compare the Ambu Aura40 and Baska Mask in terms of the number of insertions attempts and ease of insertion. Secondary objectives were to assess haemodynamic changes and postoperative complications associated with each device.

Methods: This prospective, randomized study included 80 ASA I–II patients aged 18–65 years, undergoing elective surgery under general anaesthesia. Patients were randomly allocated to Group A (Ambu Aura40, n = 40) or Group B (Baska Mask, n = 40). Outcomes assessed included the number of insertion attempts, ease of insertion, haemodynamic parameters, and postoperative complications.

Results: Demographic variables were comparable between groups. Group A had higher first-attempt success (95% vs. 80%, $p = 0.043$) and easier insertion (95% vs. 80%, $p = 0.043$). Among Hemodynamic parameters pulse rate was significantly higher and comparable ($p < 0.001$). Postoperative complications were infrequent and statistically comparable.

Conclusion: Both Ambu Aura40 and Baska Mask are safe and effective supraglottic airway devices with stable haemodynamic profiles and low complication rates. However, Ambu Aura40 demonstrated easier insertion and higher first-attempt success, making it a more favourable option for elective airway management.

Keywords: Ambu Aura40, Baska Mask, Supraglottic Airway Device, Ease Of Insertion, Haemodynamics, Complications.

Introduction

Supraglottic airway devices (SADs) have become a cornerstone of airway management in modern anaesthesia [1,2]. They provide a non-invasive alternative to endotracheal intubation and act as an intermediate option between endotracheal tubes (ETT) and facemasks. Their ease of use, favourable safety profile, and lower complication rates have contributed to their widespread adoption in both elective and emergency procedures [3].

SADs are broadly classified into first-generation devices, which include a single ventilation lumen, and second-generation devices, which incorporate gastric drainage channels [4]. While first-generation devices are associated with risks such as aspiration, newer second-generation SADs address these limitations through design innovations that improve sealing efficiency and patient safety.

The Baska Mask, developed by Kanag and Meena Baska, incorporates unique features such as a sump reservoir, dual drainage systems, and a self-sealing cuff that enhances airway protection and reduces aspiration risk [5,6]. The Ambu Aura40 (Ambu Inc., Glen Burnie, MD, USA) is another second-generation device designed with a preformed 90° anatomical curve, a reinforced tip for easier placement, and the ability to be autoclaved up to 40

times [7–10]. Both devices are increasingly used in clinical practice due to their favourable insertion characteristics and haemodynamic tolerance [11,12].

Although several studies have evaluated these devices individually, comparative evidence between the Ambu Aura40 and Baska Mask in adult patients undergoing elective surgery remains limited. This study was therefore designed to compare the two devices in terms of ease of insertion, number of attempts, haemodynamic responses, and perioperative complications, thereby assisting anaesthetists in making evidence-based device selections.

Materials and Methods

This prospective, randomized, comparative study was conducted in the Department of Anaesthesiology, Critical Care, and Pain Medicine at SVBP Hospital, LLRM Medical College, Meerut, after obtaining approval from the Institutional Ethics Committee (No./SC-1/2024/4420, dated 13/06/2024). The trial was prospectively registered with the Clinical Trials Registry of India (CTRI/2024/08/072617). The study was carried out over 18 months, from July 2023 to December 2024.

Study Design and Sample Size: Based on the study by Verma et al. (2020), which reported a first-attempt success rate of 96.6% with the LMA Supreme and 76.6% with the Baska Mask, the sample size was calculated to achieve 80% power at a 5% significance level. The minimum required sample was 40 patients per group, resulting in a total of 80 participants.

Inclusion and Exclusion Criteria: Adult patients aged 18–65 years of either gender, classified as ASA physical status I or II, undergoing elective surgery under general anaesthesia with predicted normal airways, were included. Patients who refused participation, those undergoing airway-related surgery, and those with severe systemic illness were excluded.

Randomization and Consent: Participants were randomly allocated into two equal groups using a computer-generated random table:

- **Group A:** Ambu Aura40 (n = 40)
- **Group B:** Baska Mask (n = 40)

Written informed consent was obtained from all patients after providing verbal and written information in their local language.

Anaesthetic Technique: Baseline monitoring included non-invasive blood pressure (NIBP), pulse rate (PR), oxygen saturation (SpO_2), and electrocardiography (ECG). Premedication consisted of intravenous ondansetron 0.1 mg/kg, glycopyrrolate 0.005 mg/kg, and midazolam 0.1 mg/kg. Patients were pre-oxygenated with 100% oxygen for three minutes, followed by induction with ketamine 0.5 mg/kg IV and propofol 1.5–2.5 mg/kg IV. Bag-mask ventilation with 100% oxygen was performed before device insertion.

The allocated device was lubricated and inserted in the semi-sniffing position using gentle rotational movements until resistance was felt. Correct placement was confirmed by bilateral chest auscultation. Anaesthesia was maintained with controlled ventilation using 50% oxygen, 50% nitrous oxide, isoflurane, and vecuronium.

Postoperative Management: At the end of surgery, neuromuscular blockade was reversed with glycopyrrolate 0.008 mg/kg IV and neostigmine 0.05 mg/kg IV. The device was removed after cuff deflation once the patient regained consciousness and responded to verbal commands. Patients were monitored for airway complications such as sore throat, trauma, dysphagia, regurgitation, aspiration, and laryngospasm.

Outcomes: The outcomes assessed included the number of insertion attempts, ease of insertion, haemodynamic parameters (PR, SBP, DBP, MAP, SpO_2), and postoperative complications.

Statistical Analysis: Data were analysed using SPSS version 25.0 (IBM Corp., USA). Continuous variables were expressed as mean ± SD or median with interquartile range (IQR), while categorical variables were expressed as frequencies and percentages. The Mann–Whitney U test was used for ordinal/non-normally distributed data, and the Chi-square test or Fisher's exact test was used for categorical data. A p-value < 0.05 was considered statistically significant.

Results

Insertion Attempts and Ease of Insertion: Group A showed a significantly higher first-attempt success rate (95% vs. 80%; $p = 0.043$). Similarly, ease of insertion was better in Group A (95% easy vs. 80% in Group B; $p = 0.043$).

Table 1: Insertion Attempts Across Groups

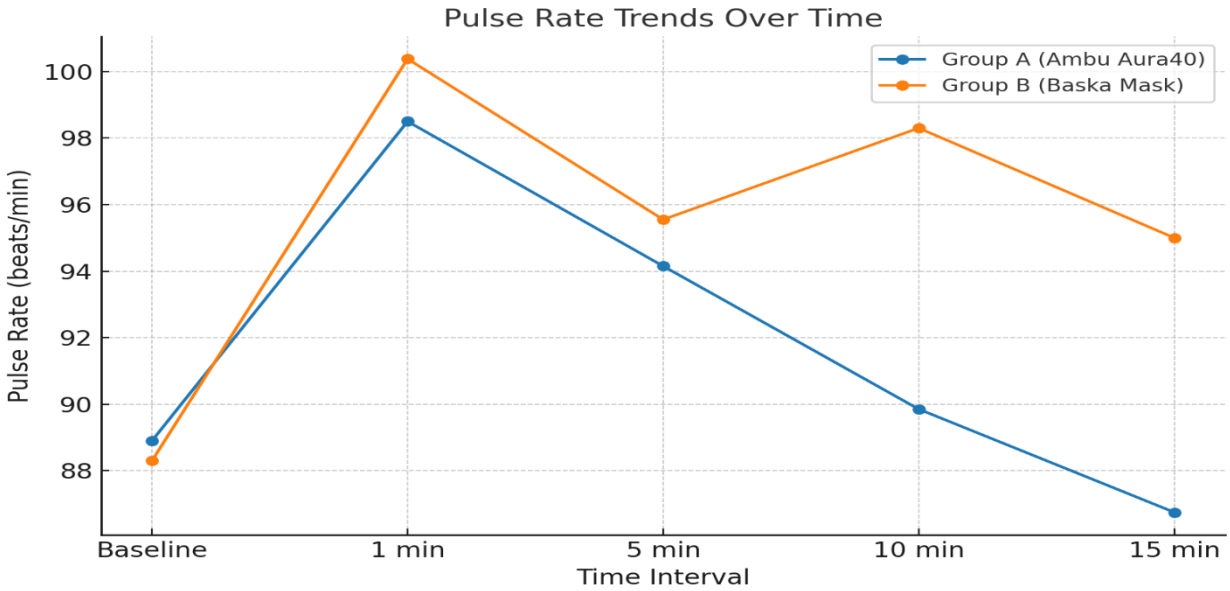
Attempts	Group A (n=40)	Group B (n=40)	p-value
1 attempt	38 (95.0%)	32 (80.0%)	0.043*
2 attempts	2 (5.0%)	8 (20.0%)	

Table 2: Ease of Insertion Across Groups

Ease of Insertion	Group A (n=40)	Group B (n=40)	p-value
Easy	38 (95.0%)	32 (80.0%)	0.043*
Difficult	2 (5.0%)	8 (20.0%)	

* Statistically significant

Haemodynamic Parameters: Pulse rate was comparable at baseline, 1, and 5 minutes, but was significantly higher in Group B at 10 and 15 minutes ($p < 0.001$). SBP, DBP, and MAP showed no clinically significant differences except for isolated time points, while SpO_2 remained comparable throughout.



(line graph showing higher PR at 10 and 15 min in Group B)

Complications: Complications were infrequent and statistically similar. Blood-stained secretions occurred in 7.5% of Group A vs. 5% of Group B; dysphagia occurred in 5% of both groups; regurgitation occurred in 5% of Group A vs. none in Group B; and sore throat occurred in 5% of Group A vs. 2.5% of Group B.

Table 3: Postoperative Complications

Complication	Group A (n=40)	Group B (n=40)	p-value
Blood stain	3 (7.5%)	2 (5.0%)	0.644
Dysphagia	2 (5.0%)	2 (5.0%)	1.000
Regurgitation	2 (5.0%)	0 (0.0%)	0.152
Sore throat	2 (5.0%)	1 (2.5%)	0.556

Discussion

This study compared the Ambu Aura40 and Baska Mask in adult patients undergoing elective surgery and found both devices to be safe and effective. However, Ambu Aura40 was superior in terms of ease of insertion and first-attempt success, which are critical factors in airway management.

Our findings are consistent with previous studies. Jamgond S et al. [13] reported higher positioning success with Ambu Aura 40™ compared to LMA Classic™ and I-gel™, while Verma et al. [14] observed significantly higher first-attempt success with LMA Supreme compared to Baska Mask. Quadir A et al. [15] showed shorter insertion times and higher success with Ambu Aura40™ compared to LMA ProSeal™, and Raj A et al. [16] also found better outcomes with Ambu Aura40™ than Classic LMA. Padmanabhan and Chandrashekharan [17] further confirmed that Ambu Aura40™ required fewer attempts compared to other SADs.

Haemodynamic stability was maintained with both devices. Although pulse rates were slightly higher with the Baska Mask at later time points, the overall differences were not clinically significant. This aligns with Bindal et al. [18], who found no significant haemodynamic variations between SADs, including Baska Mask, LMA, and I-gel.

Postoperative complications were minimal and comparable, with sore throat and dysphagia being the most common. Our results are in line with Jayalekshmi et al. [19], who reported sore throat as the predominant morbidity with no difference between Baska Mask and LMA Supreme, and with Sachinanda et al. [20], who observed similar complication rates between I-gel and Baska Mask.

Limitations of the study include the exclusion of paediatric, elderly, and complex airway patients, limiting generalizability. The subjective assessment of ease of insertion may have introduced observer bias, and the relatively small sample size may have limited statistical power. Larger multicentre trials are needed for validation.

Overall, both Ambu Aura40 and Baska Mask are safe options for airway management. Still, Ambu Aura40 offers advantages in ease of use and first-attempt success, making it a preferable device in elective anaesthesia practice.

Conclusion

Both Ambu Aura40 and Baska Mask are effective supraglottic airway devices with stable haemodynamics and low complication rates. Ambu Aura40, however, demonstrated superior ease of insertion and a higher first-attempt success rate. Device selection should ultimately be based on anaesthetist preference and patient-specific requirements.

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