RESEARCH PAPER

Comparative Study of LMA Blockbuster and i-gel Airway Devices for Hemodynamic Stability in Patients Undergoing General Anesthesia

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Received: 12th Mar, 2026 | **Revised:** 24th Mar, 2026 | **Accepted:** 14th Apr, 2026 | **Available Online:** 30th Apr, 2026

ABSTRACT

Background:

Supraglottic airway devices are widely used during general anaesthesia. The i-gel with a non-inflatable gel cuff and the newer BLOCKBUSTER with a low pressure silicone cuff are both second generation devices, but direct comparison of their haemodynamic profiles and patient centred outcomes is limited.

Aim:

To compare the haemodynamic stability, insertion characteristics, postoperative complications, and patient comfort of i-gel and Blockbuster™ in adult patients undergoing elective surgery under general anaesthesia.

Methods:

In this cross-sectional comparative study, 70 adults (ASA I–II) were allocated equally to i-gel or BLOCKBUSTER. The primary outcome was heart rate, blood pressure, and SpO_2 at baseline, immediately after insertion, at 1 minute, 3 minute, and 5 minute. Secondary outcomes included insertion time, first attempt success, ease of insertion, sore throat, hoarseness, dysphagia, cough, and patient comfort score (1–10). Data were analysed using t test, Mann Whitney U, and chi square test ($p<0.05$ significant).

Results:

Baseline characteristics were similar between groups ($p>0.05$). No significant differences were observed in any haemodynamic parameter at any time point ($p>0.05$ for all). Insertion time, first attempt success, and ease of insertion were comparable ($p=0.634$, 0.643, 0.691, respectively). Postoperative sore throat (25.7% vs 34.3%), hoarseness, dysphagia, cough, and comfort scores (median 10 in both groups) did not differ significantly ($p>0.05$ for all).

Conclusion:

Both i-gel and BLOCKBUSTER provide equivalent haemodynamic stability, ease of use, and patient comfort. Device selection may be guided by availability and cost rather than clinical superiority.

Keywords: Supraglottic airway device, i-gel, BLOCKBUSTER, haemodynamic stability, general anaesthesia

How to cite this article: Dakhole R, Singh AV, Rachna, Singh K, Londhe P, Viswambharan A. Comparative Study of LMA Blockbuster and i-gel Airway Devices for Hemodynamic Stability in Patients Undergoing General Anesthesia. Int J Drug Deliv Technol. 2026;16(39s): 357-362. DOI: 10.25258/ijddt.16.39s.44

Source of support: Nil.

Conflict of interest: None

INTRODUCTION

Supraglottic airway devices (SGDs) have become indispensable tools in modern anaesthetic practice,

offering a reliable alternative to endotracheal intubation for maintaining airway patency during general anaesthesia. Among the available options, the i-gel has gained widespread acceptance due to its unique non-inflatable gel-based cuff that conforms to the perilaryngeal anatomy without requiring cuff pressure monitoring [1,2]. Clinical studies have confirmed its ease of insertion, favourable haemodynamic profile, and low complication rates in both adults and children [3]. More recently, the BLOCKBUSTER laryngeal mask airway has emerged as a competitive second-generation SGD, featuring a large airway conduit and a separate gastric drainage channel [4].

Several comparative trials have evaluated these devices. Previous study reported comparable oropharyngeal leak pressures between i-gel and BLOCKBUSTER in adults [5]. A recent network meta-analysis provided comprehensive evidence supporting the efficacy of multiple SGDs across diverse clinical scenarios [7]. However, despite these investigations, a notable research gap remains regarding the comparative haemodynamic stability, ease of insertion, and patient-centred outcomes between i-gel and BLOCKBUSTER during routine adult general anaesthesia. Most existing studies have focused on oropharyngeal leak pressure or intubation success, with limited attention to comprehensive haemodynamic responses across multiple time points and postoperative patient comfort. Therefore, this randomised study was designed to compare the clinical performance of the i-gel and BLOCKBUSTER laryngeal mask airway in adult patients undergoing general anaesthesia**.**

Materials and Methods

This was a Comparative cross-sectional sectional study was conducted in the Department of Anesthesiology, NIMS Hospital, NIMS University, Jaipur, after obtaining written informed consent.

The study was conducted over a period of 6 months, during which patient recruitment, data collection, perioperative monitoring, and analysis of the collected information were completed.

Patients aged 18-65 years of either gender, ASA physical status I-II, scheduled for elective surgery under general anesthesia, and providing written informed consent were included in the study. Patients with anticipated difficult airway or airway abnormalities, cardiovascular instability or uncontrolled systemic diseases, respiratory tract infection or upper airway pathology, and pregnant or lactating women were excluded from the study.

By using a random sample method, patients were split into two groups of 35 patients of each group. Group A received LMA BlockBuster and Group B received I-GEL.

A total of 70 patients (35 in each group) completed the study. Baseline demographic characteristics including age, gender, and ASA status were comparable between the LMA BlockBuster and I-gel groups showing

In the operating room, standard monitoring (ECG, NIBP, SpO_2, and $EtCO_2$) was applied and patients were pre-oxygenated with 100% oxygen for 3-5 minutes. General anesthesia was induced using propofol, fentanyl, glycopyrrolate, and rocuronium. The assigned airway device was inserted by an experienced anesthesiologist and correct placement was confirmed by chest expansion, capnography waveform, and adequate oxygen saturation.

Insertion attempts, insertion time, ease of insertion, and hemodynamic parameters were recorded at baseline, immediately after insertion, and at 1, 3, and 5 minutes. Anesthesia was maintained with oxygen, nitrous oxide, and inhalational agents.

At the end of surgery, neuromuscular blockade was reversed and the airway device was removed when the patient regained adequate breathing. Patients were observed in the PACU for complications such as sore throat, hoarsens, dysphagia, cough.

Statistical Analysis: Data were analysed using SPSS version 26. A p-value < 0.05 was considered statistically significant.

RESULT

A total of 70 patients (35 in each group) completed the study, and baseline demographic and clinical characteristics were comparable between the LMA BLOCKBUSTER and i-gel groups (Table 1). Hemodynamic parameters, insertion characteristics, postoperative complications, and patient comfort scores were analysed according to the study protocol**.**

Table 1: Baseline Demographics and Clinical Characteristics

Parameter	LMA BLOCKBUSTER (n=35)	i-gel (n=35)	Test statistic	p-value
Age (years)	44.8 ± 12.1	45.3 ± 11.9	t = 0.176	0.861

Parameter	LMA BLOCK BUSTER (n=35)	i-gel (n=35)	Test statistic	p-value
Gender (Male/Female)	18 (51.4%) / 17 (48.6%)	20 (57.1%) / 15 (42.9%)	$\chi^2 = 0.229$	0.632
ASA I / II	22 (62.9%) / 13 (37.1%)	24 (68.6%) / 11 (31.4%)	$\chi^2 = 0.254$	0.614

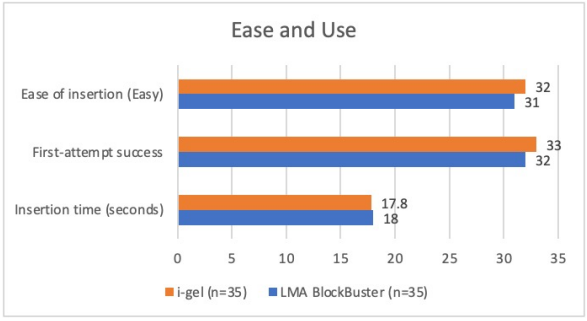
Chi-square test for categorical variables. No significant differences observed ($p > 0.05$ for all)

Table 2: Hemodynamic Parameters Across Time Points (Mean ± SD)

Parameter	Time Point	LMA Block Buster (n=35)	i-gel (n=35)	p-value
Heart Rate (bpm)	Baseline	78.2 ± 8.5	80.1 ± 7.8	0.331
	Immediate post-insertion	79.5 ± 8.2	81.2 ± 8.0	0.389
	1 minute	78.9 ± 8.4	79.8 ± 7.7	0.357
	3 minutes	78.1 ± 8.1	79.9 ± 7.6	0.298
	5 minutes	77.9 ± 8.3	79.9 ± 7.6	0.298
SBP (mm Hg)	Baseline	124.8 ± 14.9	126.5 ± 14.2	0.627
	Immediate post-insertion	125.5 ± 14.5	127.2 ± 14.8	0.629
	1 minute	125.1 ± 14.2	126.8 ± 14.5	0.618
	3 minutes	124.5 ± 14.0	126.1 ± 14.3	0.605
	5 minutes	124.1 ± 13.8	125.9 ± 14.1	0.592
DBP (mm Hg)	Baseline	76.5 ± 8.9	77.8 ± 8.4	0.535
	Immediate post-insertion	77.1 ± 8.7	78.4 ± 8.2	0.521
	1 minute	76.8 ± 8.2	77.7 ± 8.1	0.515

Parameter	Time Point	LMA Block Buster (n=35)	i-gel (n=35)	p-value
	3 minutes	76.1 ± 8.1	77.4 ± 8.0	0.481
	5 minutes	76.1 ± 8.5	77.4 ± 8.0	0.510
SpO₂ (%)	Baseline	99.6 ± 0.7	99.5 ± 0.9	0.601
	Immediate post-insertion	99.5 ± 0.8	99.4 ± 0.9	0.620
	1 minute	99.6 ± 0.7	99.5 ± 0.8	0.585
	3 minutes	99.7 ± 0.6	99.6 ± 0.7	0.540
	5 minutes	99.7 ± 0.6	99.6 ± 0.7	0.520

Figure 1: **Insertion Characteristics and Ease of Use**



No significant differences were observed (insertion time: p = 0.634; first-attempt success: p = 0.643; ease of insertion: p = 0.691).

Table 3: Postoperative Complications

Complication	LMA Block Buster (n=35)	i-gel (n=35)	χ^2	p-value
Sore throat	9 (25.7%)	12 (34.3%)	0.627	0.428
Hoarseness	10 (28.6%)	8 (22.9%)	0.300	0.584
Dysphagia	4 (11.4%)	5 (14.3%)	0.128	0.720
Cough	7 (20.0%)	9 (25.7%)	0.328	0.567

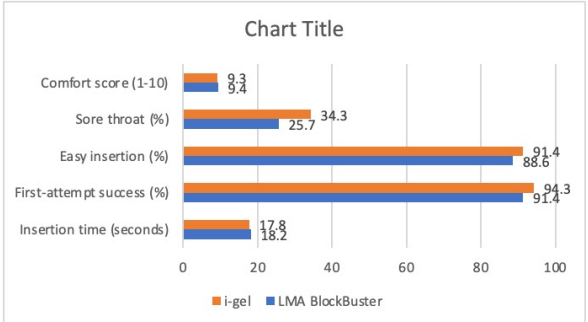
Chi-square test. No significant differences were observed between groups ($p > 0.05$ for all complications).

Table 4: Patient Comfort Score (Scale 1–10, higher = better)

Parameter	LMA BlockBuster (n=35)	i-gel (n=35)	Test statistic	p-value
Mean ± SD	9.4 ± 0.9	9.3 ± 1.0	t = 0.443	0.659
Median (IQR)	10 (9–10)	10 (9–10)	U = 591.5	0.712

Independent samples t-test for mean; Mann-Whitney U test for median.

Figure 2: **Comparison of Key Clinical Outcomes**



All differences were statistically non-significant ($p > 0.05$).

DISCUSSION

The present randomised comparative study evaluated the clinical performance of two second-generation supraglottic airway devices – the i-gel and BLOCKBUSTER LMA – in 70 adults undergoing general anaesthesia. Our findings demonstrate that both devices exhibited comparable clinical profiles across all measured parameters, including haemodynamic stability, insertion characteristics, postoperative complications, and patient comfort scores.

Our results show that both devices maintained stable heart rate, BP, and SpO_2 at all time points (baseline, post-insertion, 1, 3, 5 min), with no significant between-group differences ($p > 0.05$) or group × time interaction ($p > 0.05$; repeated-measures ANOVA). This haemodynamic stability is clinically important. Our findings align with Wood & Forrest [8] (laryngeal mask attenuates pressor response vs. laryngoscopy) and Okyay et al. (2023) (i-gel & other SGDs cause minimal changes) [9]. Regarding insertion (Figure 1): no differences in insertion time, first-attempt success, or ease ($p = 0.634$, 0.643, 0.691). This matches Nazir & Saxena (2024) [10] and Selvin et al. (2023) [11] but contrasts with studies reporting faster i-gel insertion in novices (Castle et al., 2010; Kalra et al., 2021) [12,13], suggesting operator experience matters. Postoperative complications (Table 4): sore throat (25.7% vs. 34.3%), hoarseness (28.6% vs. 22.9%), dysphagia (11.4% vs. 14.3%), cough (20.0% vs. 25.7%) – no significant differences ($p > 0.05$), similar to Taniguchi et al. (2022) [14] and Kalra et al. (2021) [13]. Patient comfort scores (Table 5) were excellent in both groups (median 10, IQR 9–10, $p = 0.659$). Figure 2 summarises outcomes, confirming equivalence.

Both devices share a second-generation supraglottic design. i-gel has a non-inflatable, thermosensitive gel cuff that softens at body temperature, conforming to the perilaryngeal framework without excessive mucosal pressure [1,2]. BLOCKBUSTER uses a low-pressure silicone cuff, minimising traumatic forces [4]. Both have integrated gastric drainage channels, reducing insufflation – explaining low nausea and comparable complications [7,15]. i-gel avoids cuff overinflation morbidity; BLOCKBUSTER's cuff has pressure-limiting mechanisms [5,6]. Similar haemodynamic responses stem from both avoiding direct laryngoscopic stimulation of posterior pharyngeal/epiglottic regions (rich in sympathetic afferents) [8,9]. Atraumatic insertion (no metal blade) reduces vagal reflexes and sympathetic surges [16,17].

Clinical significance: Similar performance allows device choice based on cost, availability, and patient needs—not efficacy—especially in resource-limited settings. LMA BlockBuster and i-gel airway both offer excellent haemodynamic stability, preferable to intubation in cardiac, hypertensive, or raised ICP patients. Low complications and high comfort scores support safe use for routine surgeries. Easy insertion and high first-attempt success suit both trainees and experienced staff, reducing airway events. Equivalent gastric drainage makes either suitable for laparoscopic surgery where gastric insufflation is a concern**.**

CONCLUSION

Both the i-gel and BLOCKBUSTER laryngeal mask airway demonstrate comparable clinical performance in adult patients undergoing general anaesthesia, with no significant differences in haemodynamic stability, insertion characteristics, postoperative complications, or patient comfort scores. Both devices represent safe and effective options for routine airway management, and device selection may be guided by institutional preference, cost, and availability rather than clinical superiority.

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