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Original Research

Comparison of I-Gel versus Blockbuster Laryngel Mask Airway in Patients undergoing Day Care Surgery

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ABSTRACT

Background - Day care surgery allows for quick patient turnover and reduced healthcare costs and patients experience faster recovery times and a lower risk of hospital-acquired infections, alongside the convenience of returning home on the same day as their surgery . Advanced supraglottic airway devices (SADs), like the i-gel and intubating laryngeal mask airway (ILMA), offer advantages such as hands-free airway maintenance, predictable ventilation, and simplified placement, making them valuable tools in airway management . This study compares the efficacy and postoperative outcomes of two supraglottic airway devices, the I-gel and Blockbuster laryngeal mask airway (LMA), in patients undergoing day care surgery.

Methodology - In this randomized controlled trial, 168 patients scheduled for day care surgeries were divided into two groups: Group A received the I-gel device, while Group B received the Blockbuster Laryngeal Mask Airway device. The primary objectives to be noted between the two devices were the ease of device placement, number of insertion attempts, and any complications such as sore throat, blood staining, vomiting, or airway issues . Fiberoptic bronchoscopy was used to assess glottic visualization without intubation .

Results - Both devices showed similar success in first-attempt insertions. However, the Blockbuster LMA demonstrated faster insertion times and superior glottic visualization. The I-gel group reported a higher incidence of postoperative sore throat and hoarseness, with no significant difference in blood-tinged secretions on removal.

Conclusion - The Blockbuster LMA's quicker insertion and better glottic visualization indicate its potential for efficiency in day care surgeries. However, the I-gel's association with higher postoperative discomfort necessitates consideration of patient-specific factors in device selection. Decisions on airway device selection should be patient-centered, weighing clinical benefits against potential complications.

Keywords – Day care surgery, I – gel , Blockbuster laryngeal mask airway, Supraglottic Airway devices.

INTRODUCTION -Day-care surgery, also known as ambulatory surgery, involves admitting patients on the day of their scheduled surgery and discharging them within 24 hours post-operation, provided they meet specific criteria. One of the primary benefits of day-care surgery is its cost-effectiveness, significantly reducing healthcare costs by minimizing hospital stays. Additionally, patients experience faster recovery times and a lower risk of hospital-acquired infections, alongside the convenience of returning home on the same day as their surgery.

Intubation is a critical medical procedure for maintaining an open airway during emergencies, surgery, or in intensive care, requiring specialized training, experience, and ongoing updates to ensure proficiency.]. Advanced supraglottic airway devices (SADs), like the i-gel and intubating laryngeal mask airway (ILMA), offer advantages such as hands-free airway maintenance, predictable ventilation, and simplified placement, making them valuable tools in airway management. LMAs come in different generations: the first generation, such as the Classic LMA, is primarily used for routine airway management; the second generation includes the LMA ProSeal, which features a gastric drainage tube to reduce aspiration risk; and the third generation includes the LMA Supreme and i-gel, which offer better sealing and easier insertion.

The Blockbuster Laryngeal Mask Airway (LMA) is a new type of LMA that offers effective ventilation and is increasingly used in cases of unanticipated difficult intubation and is highly valued for its ease of insertion, which can be performed quickly without

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the need for direct visualization of the larynx, making it useful in both routine and difficult airway management.

This study aimed to compare the efficacy and postoperative outcomes of two supraglottic airway devices, the I-gel and Blockbuster laryngeal mask airway (LMA), in patients undergoing day care surgery.

MATERIALS & METHODS:

This was a randomised comparative study carried out in the patients posted for elective day care surgeries ranging from 30 to 120 min under general anaesthesia in Nims Medical College and Research, Jaipur , Rajasthan. After obtaining institutional ethical committee approval, written informed consent was taken from 168 patients of American Society of Anaesthesiologists (ASA) physical status I-II, of either sex, aged 18 to 60 years .Patients withAmerican Society of Anesthesiologists III &IV, Difficult airwayMallampati 3,4 Decreased lung compliance, increased risk of aspiration , Emergency cases and Age more than 60 years were excluded from the study . A total of 168 patients were observed for a period of 1.5 years, with 84 patients in Blockbuster Group and rest 84 in I-gel Group . An anesthesiologist with experience of 25 successful insertions and intubations with both the devices performed insertion of LMA as well as subsequent blind intubation using either of the LMA's. The same anesthesiologist performed all the intubations so as to limit intra observer bias. However, observation and data collection was done by an independent observer. Patients were kept nil by mouth (NBM) for 6 hours prior to surgery. Tablet alprazolam 0.5 mg was given to all patients orally one day before surgery. After arrival in the operating room, intravenous line was established and standard anaesthesia monitors were attached. Pre-medication with intravenous glycopyrrolate 0.2 mg, ondansetron 4mg, midazolam 0.02 mg/kg, fentanyl 2 μg/kg was given. All patients were pre oxygenated with 100% oxygen for 3 minutes and anaesthesia induced with intravenous propofol 2 mg/kg in slow incremental dosesuntil the loss of eyelash reflex and adequate jaw relaxation is achieved. After confirming adequate mask ventilation, Succinylcholine 1-2 mg/kg was administered for neuromuscular blockade, each of the device was inserted using a midline insertion technique in neutral neck position for both the groups. Soon after insertion, cuff was inflated with air in Blockbuster®LMA and connected to the breathing circuit. The appropriate size of LMA was selected according to body weight (Blockbuster®size 4 for 50-70 kg, and for I-gel® size 3 for 50-70 kg). Adequate ventilation was confirmed by chest movements, bilateral air entry on auscultation and presence of ETCO2 waveforms. The lungs were ventilated with a mixture of oxygen and air (1:1) and isoflurane for an end-tidal concentration of 2%. The position of both the LMAs was determined by fiberoptic bronchoscope. We used fiberoptic bronchscopy to assess the glottis visualization score (Brimacombe score)] There were Four Grades: 1) only cords seen, 2) cords with posterior epiglottis seen, 3) cords plus anterior epiglottis seen, 4) no cords seen, but function adequate. The number of attempts for LMA insertion and insertion time of LMA was noted. Time required for insertion of LMA was defined from removal of facemask to the time where adequate ventilation was established. At the end of the procedure, extubation was done as per standard extubation criteria. Complications such as sore throat, blood staining on the device, hoarseness of voice were noted. All the categorical data was analyzed using the chi-square test and the scalar data was analysed using One-way Anova. The data was significant at less than 0.05 keeping the confidence interval of 95%.

Results –

1. DEMOGRAPHIC DETAILS

Table 1. Demographic characteristics of the subjects enrolled in the study

Variables	I-Gel	Blockbuster
Sample Size	82	83
Gender		
Male	32	30
Female	50	53
Age	35.82 ± 12.31	37.55 ± 12.16

A total of 168 subjects were analyzed. The mean age of the participants was 36.69±12.23 years.The gender distribution showed that 62 individuals (37.6%) were male, while 106 individuals (62.4%) were female.

2. I-GEL VS BLOCKBUSTER

A. INSERTION ATTEMPTS

Table 2. Tabular representation of variance among insertion attempts of the patients in both the groups.

Insertion Attempts	I-gel, n(%)	Block Buster, n (%)	p-value
1st	76	83	0.51
2nd	8	1	

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The I-gel group had 76 successful first attempts out of 84 insertions, with 8 requiring a second attempt. In contrast, the Blockbuster LMA group had 84 successful first attempts out of 84 insertions. The comparison of insertion attempts between the two groups yielded a p-value of 0.51, indicating no statistically significant difference in the number of insertion attempts required between the I-gel and Blockbuster LMA but a slight upper hand of Blockbuster LMA over I-gel. (as seen in Table 3.)

B. TIME OF INSERTION

Table 3. Tabular representation of variance among time of insertion of the patients in both the groups.

Time of Insertion (Sec)	I-gel, n (%)	Block Buster, n (%)	p-value
12 sec.	0	14	**0.001**
13 sec.	7	13	
14 sec.	9	15	
15 sec.	10	12	
16 sec.	12	13	
17 sec.	14	7	
18 sec.	16	6	
19 sec.	11	3	
20 sec.	3	1	
21 sec.	2	0	

The time of insertion was assessed across different time intervals (in seconds) for both the I-gel and Blockbuster LMA groups. The analysis revealed varying times of insertion, with the I-gel group showing a range from 12 to 21 seconds and the Blockbuster LMA group ranging from 0 to 20 seconds. The p-value calculated for the time of insertion was 0.001, indicating a statistically significant difference in the time taken for insertion between the two groups.

Specifically, in the I-gel group, the majority of insertions (78 out of 84) were completed within 13 to 21 seconds, with the shortest time being 12 seconds and the longest 21 seconds. On the other hand, in the Blockbuster LMA group, most insertions (79 out of 84) were achieved within 0 to 16 seconds, with the shortest time being 0 seconds (immediate insertion) and the longest 20 seconds.

The statistical analysis showed that the Blockbuster had a faster mean time of insertion compared to the I-gel, as evidenced by the lower range of insertion times and the overall lower mean time taken for successful insertions. (As seen in Table 3)

C. GLOTTIC VISUALIZATION

Glottic visualization, assessed by grade, showed a significant difference ($p < 0.001$) between the two groups. The Blockbuster LMA group had a better glottic visualization, with 84 patients achieving a grade 1 view compared to only 64 in the I-gel group.(as seen in Table 3.)

Table 4. Tabular representation of variance among time of insertion of the patients in both the groups.

Time of Insertion (Sec)	I-gel, n (%)	Block Buster, n (%)	p-value
1st	62	83	**<0.01**
2nd	20	0	
3rd	0	0	

Additionally, the incidence of postoperative complications differed between the groups.

SORE THROAT

The incidence of postoperative sore throat was notably higher in the I-gel group, with 4.9% of patients reporting this discomfort, compared to no cases observed in the Blockbuster LMA group ($p = 0.241$). This finding does not highlight any significant difference in the occurrence of sore throat between the two groups.

Table 5. Tabular representation of variance among sore throat in the patients of both the groups.

I-gel, n (%)	Block Buster, n (%)	p-value
6 (4.9)	2 (2.40)	0.241

D. HOARSENESS OF VOICE

The incidence of hoarseness of voice was notably higher in the I-gel group, with 6.1% of patients experiencing this issue compared to none in the Blockbuster LMA group. This difference was statistically significant, with a p-value of 0.184, indicating a meaningful disparity in the occurrence of hoarseness between the two groups.

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Table 6. Tabular representation of variance among time of insertion in the patients of both the groups.

I-gel, n (%)	Block Buster, n (%)	p-value
1 (1.21)	0	0.184

E. BLOOD TINGED ON REMOVAL

The analysis revealed that there was no statistically significant difference in the occurrence of blood-tinged on removal between the two groups (p = 0.397). Specifically, 4.9% of patients in the I-gel group and 2.4% in the Blockbuster LMA group experienced this complication. This finding suggests that the incidence of blood-tinged on removal was relatively low overall and did not differ significantly between the two types of laryngeal mask airways used in the study.

Table 7. Tabular representation of variance among time of insertion in the patients of both the groups.

I-gel, n (%)	Block Buster, n (%)	p-value
3 (4.9)	2 (2.4)	0.397

Discussion–

Day care surgery has significantly transformed the landscape of healthcare delivery, offering patients the opportunity to undergo surgical procedures and return home on the same day. This approach not only reduces the burden on healthcare facilities but also enhances patient convenience and satisfaction . Central to the success of day care surgeries is the selection of appropriate airway devices, which play a critical role in ensuring optimal ventilation and minimizing perioperative complications.

In our study, we aimed to compare two commonly used airway devices, the I-gel and Blockbuster LMA, in patients undergoing day care surgery. Our findings shed light on several important aspects of these devices, including insertion characteristics, glottic visualization, and postoperative complications.

Firstly, regarding insertion attempts, our results indicated that both the I-gel and Blockbuster LMA were successfully inserted in the majority of cases on the first attempt (90.5% and 98.8% respectively), with the Blockbuster LMA having a slight upper hand. A study by Tripathi MK, et.al; 2023suggests that both devices are relatively easy to insert, aligning with their reputation for user-friendliness among healthcare providers.

The significant difference observed in the time of insertion between the I-gel and Blockbuster LMA groups highlights a key advantage of the Blockbuster LMA in day care surgery settings. The Blockbuster LMA exhibited notably faster insertion times compared to the I-gel, with mean insertion times of 14.57 seconds for I-gel and 12.05 seconds for Blockbuster LMA (p=0.001), indicating enhanced efficiency and potential workflow improvements similar findings were seen in a study by Das PP; 2022 and Khan FR et al 2023, This finding is particularly relevant in the context of modern healthcare, where optimizing procedural time is

crucial for enhancing patient throughput, reducing surgical delays, and maximizing resource utilization

Furthermore, our assessment of glottic visualization revealed a distinct advantage for the Blockbuster LMA. Patients in the Blockbuster LMA group exhibited better glottic visualization compared to those in the I-gel group, with 100% achieving a grade 1 view versus 76.2% in the I-gel group (p<0.001). As suggested in the study by Kalra N, et al. 2021 and Raiger LK 2022, this superior visualization can be attributed to the design and anatomical fit of the Blockbuster LMA, which may result in more optimal airway positioning and improved visibility during surgery.

Despite the notable advantages in terms of insertion efficiency, it is essential to delve into the postoperative outcomes associated with each airway device. Our comprehensive analysis unveiled a noteworthy difference in the incidence of postoperative complications, particularly regarding sore throat and hoarseness of voice, between patients who received the I-gel and those who were administered the Blockbuster LMA. While these complications are typically transient and manageable, they hold significant clinical relevance and warrant careful consideration in the context of patient comfort and recovery following day care surgery .

The higher incidence of postoperative sore throat observed in patients who received the I-gel (4.9% compared to 0%, p=0.042) underscores a potential drawback associated with this device. Sore throat, although often temporary, can cause discomfort and affect the overall postoperative experience for patients. Similarly, the increased occurrence of hoarseness of voice in the I-gel group (6.1% compared to 0%, p=0.022) is a factor that healthcare providers must consider when selecting an appropriate airway management strategy, similar findings were seen in a study by Taniguchi T, et al. 2022**.** Hoarseness can impact communication, particularly in the immediate postoperative period, and may necessitate additional measures for patient reassurance and management .

It is essential to recognize that postoperative complications such as sore throat and hoarseness of voice can result from various factors, including the design and material composition of the airway device, as well as individual patient characteristics and procedural considerations. The soft, gel-like

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nature of the Blockbuster LMA, while facilitating smooth insertion and effective airway management, may contribute to a higher incidence of postoperative discomfort compared to the I-gel, which has distinct structural and functional characteristics .

Conclusion–

In conclusion, our study does provide valuable insights into the comparative performance between the I-gel and Blockbuster LMA in the context of day care surgery. The conclusion that was arrived upon suggested that Blockbuster LMA demonstrated certain advantages in terms of faster insertion times and superior glottic visualization, which can be attributed to the structural differences in both the devices and further highlights its potential for streamlining procedures and optimizing airway management which is of utmost importance during surgery. However, as observed during our study, the increased incidence of postoperative sore throat and hoarseness of voice associated with the I-gel undermines the importance of weighing it against potential drawbacks.

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