

Comparison of Classic Laryngeal Mask Airway and I Gel Regarding Ease of Insertion and Efficacy of Ventilation in Lateral Position

Viral Prakashkumar Patel¹, Rekha Bayer², Hippal Patel², Kuntal Patel³

¹Assistant Professor, Department of Anaesthesia, GMERS Medical College, Himmatnagar, Gujarat, India, ²Senior Resident, Department of Anaesthesia, GMERS Medical College, Himmatnagar, Gujarat, India, ³Junior Resident, Department of Anaesthesia, GMERS Medical College, Himmatnagar, Gujarat, India.

Abstract

Background: The laryngeal mask airway (LMA) is a supraglottic airway device designed to maintain a clear airway, which sits outside of and creates a seal around the larynx. Aim of our study is to compare the ease of insertion and adverse effects using the insertion of classic LMA and I gel in lateral position and to note if there are any adverse effects between both. **Subjects and Methods:** Hundred patients of either gender aged between 15 and 70 years who belonged to ASA physical status I and II, who were posted for elective surgical procedures under general anaesthesia under supraglottic airway devices were recruited for study. They were randomly divided into four groups of 25 patients each by closed envelop method. First group is Group IRL: Patients in whom I gel was used in right lateral position Second group is Group ILL : Patients in whom I gel was used in left lateral position Third group is Group CRL : Patients in whom classic laryngeal mask airway was used in right lateral position Fourth group is Group CLL : Patients in whom classic laryngeal mask airway was used in left lateral position. **Results:** Group IRL had success rate of 88.5% in 1st attempt 11.5% in this group had 2nd attempt of LMA insertion. Group ILL had 1st attempt success rate of 76% with. 24% patients needed 2nd attempt for LMA placement Group, CRL had success rate of 86% at 1st attempt 14% patients had LMA insertion in 2nd attempt. Group CLL had 1st attempt success rate of 67% only. 33% of patients in this group needed 2nd attempt for successful LMA insertion. **Conclusion:** Supraglottic airway devices can be successfully used for securing airway in lateral position. Both classic LMA and I gel can be used to secure the airway. I gel is a supraglottic airway device with its own advantages which can be successfully used in patients who need lateral position for their surgery.

Keywords: I gel, lateral position, laryngeal mask airway, Supraglottic airway.

Corresponding Author: Dr. Rekha Bayer, Department of Anaesthesia, GMERS Medical College, Himmatnagar, Gujarat, India.

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Introduction

Securing patient airway is primary responsibility of the anesthetist. Failure to establish or maintain a patent airway can cause asphyxia and death. Endotracheal intubation is conventionally performed when the patient is in the supine position, it may be sometimes required to secure the airway in the lateral position.^[1,2] Few surgical procedures are done in lateral position under regional anaesthesia. During the course of surgery action of local anesthetic can wear off and patient can complain of pain. Then anesthetists have to induce general anaesthesia in lateral position in half way through surgery. Administration of general anaesthesia without securing airway is hazardous. It may be difficult to intubate the patient in lateral position.^[3]

Laryngeal mask airway which is a supraglottic airway device introduced by Brains in 1981 was initially used in failed intubation. This does not require the use of laryngoscope so it can be used in lateral position also. The laryngeal mask airway (LMA) is a supraglottic airway device designed to maintain a clear airway, which sits outside of and creates a

seal around the larynx. It is relatively noninvasive as compared to endotracheal intubation and in scenarios where endotracheal intubation is not mandatory, LMA has emerged as a formidable choice over endotracheal intubation.^[4] Compared with the face mask, the LMA allows for a more “hands-free approach” to airway management.^[5] In difficult airway management, LMA can bypass obstruction at supraglottic level and allow rescue oxygenation and ventilation provided that mouth opening is sufficient.^[6] I gel which is a non inflatable supraglottic airway device with a gastric channel is gaining popularity in anaesthesia practice because of its ease of insertion and stable positioning. Because of this advantages I gel is better suited for lateral position. Aim of our study is to compare the ease of insertion and adverse effects using the insertion of classic LMA and I gel in lateral position and to note if there are any adverse effects between both.

Subjects and Methods

Hundred patients of either gender aged between 15 and 70 years who belonged to ASA physical status I and II, who

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 were posted for elective surgical procedures under general anaesthesia under supraglottic airway devices were recruited for study. After obtaining the Institutional Ethical Committee's approval, written informed consent from the parent/guardian was taken for all the subjects participating in the study. They were randomly divided into four groups of 25 patients each by closed envelop method. First group is Group IRL : Patients in whom I gel was used in right lateral position Second group is Group ILL : Patients in whom I gel was used in left lateral position Third group is Group CRL : Patients in whom classic laryngeal mask airway was used in right lateral position Fourth group is Group CLL : Patients in whom classic laryngeal mask airway was used in left lateral position

Exclusion Criteria were refusal by the parent/guardian for the consent for study; the American Society of Anesthesiologists Physical Status class III and above; patient at specific risk of aspiration and anticipated difficult airway; and head and neck procedures.

A thorough pre anesthetic evaluation was done on the previous evening of surgery. Premedication was given as per department protocol. Patients were shifted inside the Operation Room at scheduled time. The patients were then turned into the lateral position depending on the groups to which they were allocated. In the lateral position, the head was positioned on pillows so that the sagittal axis of the head and neck was parallel to the tabletop and placed in a sniffing position. Monitors connected were ECG, NIBP and SpO₂. Basal parameters were noted and recorded. IV cannula was secured and IV fluid started.

In all the patients Preoxygenation was done with 100% O₂. After 3 minutes of preoxygenation, Inj. Propofol 2.5 mg/kg body weight and fentanyl 2mics/kg body weight was given. Ventilation with 100% O₂ with 1% isoflurane was continued. After 60seconds, designated supraglottic airway device insertion was tried as per the standard technique. Ease of insertion and adverse effects were noted.

Ease of LMA insertion was decided depending on time taken for LMA insertion and depending on number of attempts taken for insertion of LMA. Successful ventilation through LMA was noted using bilateral chest expansion, ETCO₂ graph, absence of audible leak at less than 20 cm of water inflation pressure and absence of gastric distension.

If the 1st attempt of LMA insertion was unsuccessful, Propofol was given 0.5 mg/kg body weight, 100% O₂ administered with Isoflurane 1% and after 30seconds, 2nd attempt of LMA insertion was attempted. If 2nd attempt is unsuccessful Inj. Propofol 0.5 mg/kg body weight given IV, O₂ administered and 3rd attempt LMA insertion was tried again after 30 seconds of Propofol injection. If 3rd attempt unsuccessful patients were excluded from the study and airway secured by alternative method. Side effects like coughing, movements of head and limbs, desaturation were noted. The device was removed after the patient regained consciousness spontaneously and responded to verbal command to open the mouth. After the removal of LMA, LMA is inspected for blood stain to assess trauma during insertion if any.

Statistical analysis:

The recorded data was compiled and entered in a spreadsheet

computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA).

Descriptive statistics included computation of percentages, means and standard deviations. For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

Demographic data in our study btw the study population showed that there was no statistical significant difference when comparing sex, mean age between the groups ($p > 0.05$).

MEAN Duration of Time Required For Insertion of Classic Lma and I Gel

IRL - 43 ± 11 sec

ILL - 59 ± 10 sec

CRL - 47 ± 11 sec

CLL - 68 ± 9 sec

Mean duration of time required for LMA insertion in right lateral to left lateral position in both groups were statistically significant with slighter time required for LMA insertion in right lateral position in both groups. ($p \leq 0.05$) Seventy six percentages of our patients had LMA being placed in position in 1st attempt successfully. Twenty four percentages of patients had 2nd attempt of LMA insertion.

Group IRL had success rate of 88.5% in 1st attempt 11.5% in this group had 2nd attempt of LMA insertion. Group ILL had 1st attempt success rate of 76% with. 24% patients needed 2nd attempt for LMA placement Group, CRL had success rate of 86% at 1st attempt 14% patients had LMA insertion in 2nd attempt. Group CLL had 1st attempt success rate of 67% only. 33% of patients in this group needed 2nd attempt for successful LMA insertion. (Table 1) Out of 100 patients 11 patients had movements during LMA insertion with CLL group having highest number of patients, Coughing was noted in 7 out of 100 patients with CLL group having 2 patients and ILL and CRL group each had 1 patient. Trauma was noted to be high in I gel group with 3 patients having trauma of which both belonging to ILL group ($p > 0.05$ statistical insignificant).

Table 1: Number of Attempts Taken For Classic Lma And I Gel Insertion

Group	1st attempt	2nd attempt	3rd attempt	Failed LMA insertion
IRL	22	3	0	0
ILL	19	6	0	0
CRL	21	4	0	0
CLL	17	8	0	0

Discussion

Before the introduction of LMA □ Classic by Dr. Brain, the choices of airway management were either facemask or tracheal tube. In the past 25 years with the development of various supraglottic airway devices, the armamentarium for airway management has increased. The best evidence requires a randomized controlled trial comparing a new device against an established alternative, properly powered

to detect clinically relevant differences in clinically important outcomes. Management of airway in supine/lateral position has seen various developments since introduction of various supraglottic airway devices.^[7] LMA insertion does not require laryngoscopy as it is blindly inserted into the hypopharynx. LMA has high success rate in hand of inexperienced user also and LMA insertion has minimal cardiovascular changes.

I gel has few special features compared to classic LMA. I gel has no cuff to inflate so making it easier to use. The airway seal improves as the device warms to body temperature. The stem is elliptical in cross-section to minimize axial rotation and provide greater stability. It has an integral bite block.^[8]

Our study had a success rate of 85% but in a study conducted by Richez et al insertion success rate was 97% which is higher than our study. In a study conducted by McCaul, the left lateral position resulted in a deterioration of laryngoscopic view in 35% of patients and improvement in none. In the lateral position, failure of airway management occurred in more patients with the endotracheal tube versus LMA. In our study group IRL and group CRL had good ease of insertion with 88.5% and 86% success rate respectively in 1st attempt compared with more patients requiring 2nd attempt 24% and 35% in group ILL and CLL respectively. This may be due to difficulty in inserting airway devices in left lateral position irrespective of type of device used.^[9,10] In the study conducted by Anitha et al out of thirty six patients, Thirty four patients could be intubated in the first attempt in the left lateral position (Group LL) whereas two required a second attempt. In the right lateral position (Group RL), only thirty patients could be intubated in the first attempt and five needed a second attempt.^[11]

Coughing was seen in 7 out of 100 patients who are less compared to study conducted by Amr M Helmy which had 8 patients who experienced cough.^[7] In our study classic LMA induced coughing in 3 patients, but only 1 patient of I gel group had cough which is in accordance with study conducted by Amr M Helmy which also showed high cough rate in patients in classic LMA group.^[7] Also in study conducted by LIAN kah ti et al patients had higher cough rate with LMA use as LMA placement is associated with deglutination and requires suppression of hypopharyngeal sensations which might not have been sufficient enough to suppress cough reflex.

In our study out of 100 patients, 11 patients had head and limb movements which is in accordance with study conducted by Molly ME et al,^[12] where they had approximately 40% patients out of 88 patients with head and limb movements. Our study shows that trauma is more in I gel group than in classic LMA group but study conducted by acott had no trauma in igel group. Our study is in accordance with study conducted by Amr M Helmy who also had two traumas in I gel patients. This may be due to hardness of I gel compared to classic LMA.^[7]

Conclusion

Supraglottic airway devices can be successfully used for securing airway in lateral position. Both classic LMA and I gel can be used to secure the airway. I gel is a supraglottic airway device with its own advantages which can be successfully used in patients who need lateral position for their surgery. It can be positioned safely even by a less experienced person and with less trauma and less chances of accidental extubation.

In our study we have also studied ease of supraglottic device insertion in left and right lateral positions. Anaesthesiologists have been trained to secure airway and also to perform laryngoscopy from right side.¹⁰ In our study also more number of attempts was required to secure airway using supraglottic airway devices with the patient in left lateral position and also time required for successful placement of airway device is more in left lateral position. Of all the airway devices I gel takes comparatively less time for insertion, produces minimal patient response compared to classic LMA and needs less expertise for insertion but I gel produced more trauma compared to classic LMA in our study. Hence we conclude that I gel can be used to secure airway successfully in lateral position compared to classic LMA.

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