

# Comparative study on ease of insertion and haemodynamic changes in I-gel versus laryngeal mask airway classic in patients under general anaesthesia

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## Abstract

**Background:** Airway management is one of the most important skills in the field of anaesthesiology. The major responsibility of an anaesthesiologist is to provide adequate ventilation to a patient. The most vital element in providing functional respiration is the airway. The aim of this comparative study is to compare the I-gel with the LMA Classic in terms of the ease of insertion of the device, intubation response to hemodynamic changes of two types of supraglottic airway devices- I-gel and cLMA. **Method:** A prospective study of 60 cases of both sexes belonging to ASA Grade I and II planned various elective procedures lasting for 45min to 1 hour duration, were randomly selected. The study group was divided in two groups of 30 each, Group I (I-gel) Group II (cLMA) were used. Ease of insertion (by number of attempts required and duration of each attempt). Changes in hemodynamic variables (Heart Rate, Systolic Blood Pressure, Diastolic Blood Pressure and Mean Arterial Pressure). compare and analyze the two supraglottic devices with regards to the above said parameters and documentation of adverse events if any. **Results:** It was found that I-gel was easier to insert as compared to cLMA in terms of duration and number of attempts required but statistically not very significant. As per hemodynamic variables I-gel and cLMA elicit similar degree of pressor response. Incidence of post operative complications as posterior pharyngeal wall trauma and sore throat was minimal with I-gel as compared to cLMA. There was no incidence of regurgitation, bronchospasm or laryngospasm in either group. **Conclusion:** I-gel is a better alternative subjectively to cLMA during general anaesthesia with respect to ease of insertion and hemodynamic stability with comparable post operative complications, though statistically not very significant.

**Key Words:** I-gel, LMA classic, Ease of insertion, Hemodynamic changes.

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## INTRODUCTION

Supraglottic airway devices have become a standard fixture in airway management, in the last two decades. These devices sit outside trachea but provide a hands free means of achieving a gas tight airway. The primary limitation of the LMA is that it does not reliably protect the lungs from regurgitated stomach contents, although it may act as a barrier at the level of the upper oesophageal sphincter if it is correctly positioned<sup>1-4</sup>. The I-gel is the most recent development in supraglottic airway devices. Great contribution in the development of this device was made by *Dr. Mohammad Aslam Nasir* in January 2007<sup>10</sup>. The I-gel is a truly anatomical device. The soft non

inflatable cuff fits snugly on to the perilaryngeal frame work, mirroring the shape of the epiglottis, aryepiglottic folds, piriform fossae, perithyroid, pericricoid, posterior cartilages and spaces<sup>10,11</sup> The seal created is sufficient for both spontaneously breathing patients and for intermittent positive pressure ventilation. A drain tube is placed lateral to the airway tube which allows insertion of the gastric tube<sup>12</sup>

### MATERIALS AND METHODS

This prospective randomised comparative study was conducted in Yenepoya medical college hospital. After getting the institutional Ethical committee clearance. After written informed consent 60 patients of either sex, aged between 15 and 70 years who belong to ASA physical status I, and II planned various elective procedures where spontaneous ventilation is ideal lasting for 45min to 1 hour duration, were randomly selected. Emergency, ASA Grade III and IV, Obese, latex allergic, history of systemic disorders, difficult airway patients were excluded. The study group was divided in two groups of 30 each, Group I (I-gel Group II (cLMA) were used. Preanaesthetic evaluation, premedication, standard monitors connected Standard anaesthesia protocol was followed. All patients were shifted to the operating table A multiparameter monitor was attached: 3 lead ECG, Pulse Oximetry, NIBP, HR, EtCO<sub>2</sub> were recorded preinduction and postinduction of anaesthesia was done as per hospital protocol. Once adequate depth of anaesthesia was achieved In **Group I:** I-gel size was selected based on the patient's weight and manufacturer's recommendations. I-gel was inserted with patient in the sniffing morning air position. The dorsum and sides of the cuff were lubricated with a thin layer of water based K-Y jelly. The device was then grasped by the integral bite block and its tip directed towards the hard palate. It was then inserted with a continuous but gentle push until resistance was felt and anaesthesia circuit was connected. In case of **Group II:** CLMA was mounted on the introducer after routine check and lubrication. The device was held by the introducer and its tip directed towards the hard palate. It was then inserted with a continuous but gentle push until resistance was felt. The introducer was removed and the cuff inflated with 2/3<sup>rd</sup> the prescribed amount of air for the particular size and the anaesthesia circuit was connected at the ventilator end Anaesthesia was maintained with oxygen and nitrous oxide (50:50) and sevoflurane 2% - 6% and patients were kept under spontaneous ventilation. Monitoring of heart rate, systolic and diastolic BP, MAP, SpO<sub>2</sub>, was done 1min, 2 min, 3 min, 4min, 5 min and every 15min thereafter insertion till end of the surgery If any incidence of hypotension,

hypertension, hypoxia or dysarrhythmia was observed, it was treated accordingly.

### RESULTS

Sixty patients under general anesthesia and supra glotic airway were studied. Age of the patient varied from 15 to 70 years. Mean age in years of Group I was 39.83±12.93 and Group II was 33.90±14.47.

Table 1: Ease of Insertion

Ease of Insertion	Group I		Group II	
	No	%	No	%
Poor	3	10.0	4	13.3
Good	25	83.3	26	86.7
Excellent	2	6.7	0	0
<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>

The ease of insertion was found to be statistically similar in two groups with P=0.543 The mean duration of insertion of group I and group II were (20.73±2.12) and (27.37±2.44) respectively. This difference was statistically significant (p=0.00001). From the table no.2 it is interpreted that in 90% patients, I-gel was inserted in 1<sup>st</sup> attempt and also cLMA was inserted in 90% patients. 3 cases (10%) required 2<sup>nd</sup> attempt for I-gel insertion as compared to 2 cases (6.7%) for cLMA insertion. However, no 3<sup>rd</sup> attempt was required for Group I but, 1 case (3.3%) in Group II and the difference was statistically similar with p=1.000. Heart rate, systolic and diastolic BP, MAP, SPO<sub>2</sub> and End Tidal CO<sub>2</sub> were regularly recorded compared in both the groups at before induction, after induction and after insertion at 1min, 2min, 3min, 4min, 5min, 20mins, 35 mins and 50mins and were found to be statistically non- significant.

Table 2: No. of Insertion Attempts

Insertion Attempts	Group I		Group II	
	No	%	No	%
1	27	90.0	27	90.0
2	3	10.0	2	6.7
3	0	0	1	3.3
<b>Total</b>	<b>30</b>	<b>100.0</b>	<b>30</b>	<b>100.0</b>

Table 3:

	Group I – I-gel	Group II – cLMA
Mean age in years	39.83	33.9
Sex ratio M:F	15:15	16:14
Mean weight in kgs	27.08	28.62
Ease of insertion(1/2/3)	3/25/2	4/26/0
No. of insertion attempts (1/2/3)	27/3/0	27/2/1
Duration of insertion (secs)	20.73	27.37
Airway sealing pressure	25.09	29.83
Post op sore throat	1	3

## DISCUSSION

In the past, choice of airway device was either facemask or endotracheal tube. British anesthesiologist, Dr. Archie Brain in 1981 invented the LMA<sup>2</sup>, the device that could easily and atraumatically be inserted in order to open the obstructed airway rapidly. LMA came into practice in 1983, since then many families of supraglottic devices were developed. Some are still in use and some had dwindled into oblivion. LMAs are used to ventilate patients lung's during anaesthesia but maybe associated with a less effective seal compared with the traditional tracheal tubes. The I-gel (Intersurgical Ltd, Wokingham, UK) is a novel supraglottic airway device, made of thermoplastic elastomer which is soft, gel-like and transparent. It was introduced for clinical practice by Dr. Mohammed Aslam Nasir in 2007. Unlike the conventional LMA, it does not have an inflatable cuff. Cadaveric studies have shown that I-gels effectively conformed to the perilaryngeal anatomy and consistently achieved proper positioning for supraglottic ventilation. Many studies have been done to compare I-gel with Proseal LMA, but not many studies have been done to compare the clinical uses of I-gel and cLMA. The aim of undertaking the present study was to compare the I-gel and cLMA in terms of various parameters as ease of insertion, hemodynamic parameters and post operative sore throat (if any). The original LMA, also called the cLMA, looks like an ETT equipped with an inflatable, elliptical, silicone rubbercollar (laryngeal mask) at the distal end. Statistical analysis was done by student t test. In our study the ease of insertion and duration of insertion were statistically significant and hemodynamic variations were not statistically significant.

## SUMMARY AND CONCLUSION

It was found that I-gel was easier to insert as compared to cLMA in terms of duration and number of attempts required but statistically not very significant. As per hemodynamic variables I-gel and cLMA elicit similar degree of pressor response. Incidence of post operative complications as posterior pharyngeal wall trauma and sore throat was minimal with I-gel as compared to cLMA. There was no incidence of regurgitation, bronchospasm or laryngospasm in either group. So, it was concluded that I-gel is a better alternative subjectively to cLMA during general anaesthesia with respect to ease of insertion and hemodynamic stability with comparable post operative complications, though statistically not very significant. Classic-LMA and I-gel can be used safely and effectively during general anaesthesia with spontaneous ventilation in selected patients. Both devices are easy to insert with adequate premedications. The duration of insertion and number of attempts at insertion was less with I-gel as

compared to cLMA, though not statistically very significant. I-gel thus, proved to be better and efficient than cLMA in this regard. The time taken for insertion was also considerably less for the I-gel highlighting its efficacy in controlled and spontaneous ventilation conditions and also in resuscitative scenarios. Hemodynamic responses elicited by each device were comparable. Post operative sore throat was minimal with I-gel and a better tolerance during recovery period was elicited, though again not significant statistically. Thus, subjectively, the I-gel is a better alternative to cLMA for airway maintenance during general anaesthesia for spontaneous ventilation and can be recommended for controlled ventilation also

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