

Comparison of Ease of I-Gel Insertion with Standard and Rotational Techniques in Adults

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ABSTRACT

Objective To compare number of attempts, mean time of Insertion, mean airway leak pressure, insertion success and blood staining at removal of I-gel insertion through standard and rotational techniques, in adult anesthetized patients.

Study design Randomized clinical trial.

Place & Duration of study Department of Anaesthesiology & SICU, Jinnah Postgraduate Medical Centre Karachi, from January 2016 to April 2016.

Methodology Patients scheduled for elective surgical procedures under general anaesthesia with controlled ventilation, were included in this study. A total of 150 patients were randomly assigned by random number into Group S (standard insertion technique - n=75) and Group R (rotational technique - n=75). Comparison was done in terms of mean time taken for I-gel insertion, mean air leak pressure, number of attempts taken for insertion and presence of blood staining on removal.

Results Mean time of insertion in Group S was 14.6 ± 3.7 second and in Group R 13.2 ± 2.7 seconds. Mean airway leak pressure was 23.1 ± 4.6 cm of H₂O in Group S and 24.4 ± 2.9 cm of H₂O in Group R. The median number of attempts taken for insertion in each group was 1. Success of insertion was 93.3% (n=70) in Group S and 98.7% (n=74) in Group R. Blood staining of I-gel at removal was noted in 22 (29.3%) and 14 (18%) patients in group S and R respectively.

Conclusion The rotational technique for I-gel insertion was better than the standard technique.

Key words I-gel, Supraglottic airway, Laryngeal mask airway.

INTRODUCTION:

Since the inception of I-gel (Intersurgical Ltd, Workingham, UK) in modern anesthesia practice, it is widely accepted among anesthesiologists, pre hospital response team members and in-hospital rapid response team to secure the airway in emergency scenarios.^{1,2,3} I-gel is the second

generation supraglottic airway device. Its design and placement is almost similar to laryngeal mask airway. I-Gel cuff is soft like gel, made of thermoplastic elastomer which does not require cuff inflation or adjustment of intra cuff pressure.⁴

I-gel stem is widened, flattened and semi rigid that prevents the kinking during insertion and acts as a buccal stabilizer to reduce axial rotation and malposition. Its inbuilt bite block avoids the compression of airway tube and it has esophageal venting port through which gastric decompression can be done. I-gel has been known to provide the adequate supralaryngeal seal for spontaneously breathing patients and for controlled ventilation during general anesthesia.^{5,6}

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The standard technique of I-gel insertion is not always easy due to its semi rigid and large cuff size that causes tongue folding. Resistance during insertion and trauma to oral cavity leads to multiple insertion attempts and increases time to successful insertion. Tongue folding is a major obstacle preventing I-gel placement.⁷ The tongue down fold can be prevented by manual tongue stabilization technique.⁷ Insertion can be managed by rotational method.⁸ The manufacturer's two persons jaw thrust technique is not useful because of desynchronization and inappropriate assistant's handling.⁹ The objective of this study was to find a better technique of I-gel insertion by comparing the standard and rotational techniques, that can be recommended for clinical practice.

METHODOLOGY:

A prospective comparative randomized analytical study was conducted at Department of Anaesthesiology & SICU, Jinnah Postgraduate Medical Centre Karachi, from January 2016 to April 2016. The study was matched for gender and ASA classification. It included adult patients of 18 year and above. The patients of ASA-I and ASA-II were enrolled for the study. All patients who had gastro esophageal reflux disorders, body mass index more than 30, pregnancy, reactive airway diseases / asthma and anticipated difficult airway, were excluded.

Following approval from ethics review committee, patients scheduled for elective surgical procedures under general anesthesia with controlled breathing, were recruited after getting informed consent. All patients were randomly assigned by random numbers generated through computer to Group-S (Standard insertion technique) and Group-R (Rotational insertion technique). All the study patients were pre medicated using oral midazolam 7.5mg one hour before surgery .

On patient's arrival in operating room, the standard anesthesia monitoring devices were applied. Following pre-oxygenation, patient was induced with propofol 2mg/kg followed by atracurium 0.5mg/kg and nalbuphin 0.2mg/kg. The I-gel Insertion was performed when patient became apneic and achieved adequate depth of anesthesia. The I-gel was inserted by using one of the study insertion techniques. I-gel size was standardized by weight (I-gel size 3 for 30-60 kg and size 4 for 50 to 90 kg and size 5 for more than 90kg).

In the standard technique(Group-S), insertion was performed by firmly grasping the lubricated I-gel along the integral bite block site with cuff outlet

facing towards the patient's chin. Before insertion chin was gently pressed down. The I-gel soft tip was introduced into patient's mouth in a direction towards the hard palate. Then I-gel was slid downwards and backwards along the hard palate with a continuous but gentle push until a definitive resistance was felt. In the rotational technique (Group-R), the I-gel was introduced into the mouth and then rotated 90° anticlockwise. The I-gel was advanced downwards, bypassing the body of the tongue. The device was advanced further until resistance was felt at the hypopharynx, and it was then re-rotated clockwise to the standard orientation, at which point it returned to the midline.

Absence of air leak (audible) at peak airway pressure >10 cm H₂O within two attempts was considered as success. Anesthesia was maintained with isoflurane, oxygen and nitrous oxide, Apneic patients were ventilated to maintain the SpO₂ >97%. I-gel was removed after patient became fully awake. Maximum of two I-gel insertion attempts were made with either technique. Variables were recorded by the primary anesthetist and included time taken for insertion and blood stained I-gel at removal. Mean airway leak pressure were recorded by second anesthetist or technician present in the operating room.

Comparison was made between number of attempts, mean time of insertion (seconds), mean airway leak pressure (cmH₂O), insertion success and blood staining at removal for ease of I-gel insertion with both the techniques.

Statistical analysis was done by using Statistical Packaging for Social Sciences (SPSS) Version 20. Student t-test was employed to compare means of quantitative variables and for association between two groups of I-gel insertion of qualitative variables. Chi-square test of independence was used, if valid, otherwise corrected Yates' Chi-square were applied. The results were considered statistically significant at p<0.05.

RESULTS:

A total of 150 patients were included with 75 patients in each group. Male to female ratio in each technique was kept as 1:1. There were 44 males and 31 females in each group. The mean age between two techniques of insertion was found statistically non-significant (p=0.09 - t=1.67). It was 29.1 ±10.4 year and 31.9 ± 9.6 year with median age of 29.1 year and 30.0 year in Group S and R respectively (table I). The median number of attempts in each group was 1. Mean time of insertion between two techniques showed significant difference (p=0.01,

Table I: Comparison of Demographic and Anesthetic variables of Two Techniques of I-Gel Insertion

Variables	I-Gel Insertion Techniques		
	Standard(n=75)	Rotation(n=75)	p-value*
Male	44	44	Matched, N.S
Female	31	31	
Age (year)	29.1 ± 10.3	31.8 ± 9.4	p=.10, t=1.64
ASA-I	52	52	Matched, N.S
ASA-II	23	23	
BMI (Kg/m ²)	25.6 ± 2.3	26.1 ± 2.3	p=0.26, t=1.13
No. of Attempts	1.28 ± 0.5	1.1 ± 0.3	p=.04, t= 2.0
Mean Time for I-gel Insertion (sec)	14.4 ± 3.6	13.3 ± 2.9	p=0.04, t= 2.17
Insertion Success	70 (93.3%)	74 (98.7%)	X ² = 2.78, =0.09
Mean Airway Leak Pressure (cm H ₂ O)	23.07 ± 4.6	24.5 ± 2.9	p=0.03, t= 2.14
Blood Stained I-gel at Removal	22 (29.3 %)	14 (18.%)	X ² = 2.78,p=0.12

*Results at P<0.05 are statistically significant.

t=2.61). I-gel standard technique had 14.6 ± 3.7 seconds time of insertion whereas I-gel rotation technique took 13.2 ± 2.7 seconds.

DISCUSSION:

In our study it was observed that the rotational technique was better than the standard technique as it required less mean time of insertion, greater mean airway leak pressure and higher rate of successful insertion. The results of our study are consistent with the results of previous similar studies. Kim et al demonstrated that the success rate of I-gel insertion at first attempt is 97% with the rotational technique as compared to 86% with the standard technique.¹⁰

In two other studies comparing the two insertion techniques for the Pro Seal LMA, it was observed that the success rate was significantly higher in the rotation group than in the standard group.¹¹ It was suggested that the standard digital technique to insert supraglottic devices such as I-gel or Pro Seal LMA should be replaced with the rotational technique.¹²

In our study the frequency of blood stained I-gel at removal was 18% (n=14) for rotational as compared to 29.3% (n=22) for standard technique. The less frequency was probably due to minimal airway trauma as the I-gel was rotated between the tongue and posterior pharyngeal wall. Previous studies, however, had shown less frequency of blood staining.^{13,14} Such a discrepancy maybe attributed to poor oral hygiene and poor dentition in our population. In our study the rotational technique

provided higher air leak pressure as compared to standard technique. This finding has been complimented by previous studies demonstrating higher leak pressures.^{15,16}

CONCLUSION:

The rotational technique for I-gel insertion was better than the standard technique in comparison for ease of insertion.

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Author's Contributions:

Muhammad Nadeem Muneer: Conceived the idea, data collection and discussion writing.
 Shoaib Malik: Data collection and statistical analysis.
 Neel Kumar: Data collection.

Conflict of Interest:

The authors declare that they have no conflict of interest.

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