

Comparison of I-gel versus proseal laryngeal mask airway (PLMA) for elective surgical procedures

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Abstract

Background: Securing airway of patient during surgery is one of the most important responsibility of anesthesiologist. Though Endotracheal Tube is gold standard for securing airway during general anesthesia, various supraglottic airway devices are invented and are in use effectively. These supraglottic airways are supposed to decrease stress response during intubation, Proseal laryngeal Mask Airway and I Gel are newer supraglottic airway devices which also contains a port for nasogastric tube. **Aims and Objectives:** To compare I-gel and Proseal LMA regarding ease of insertion of these devices, complications, and to compare ease of nasogastric tube insertion. **Materials and Methods:** Total 120 patients of age 18-65 years with ASA I and II grade were studied. Patients were premedicated with standard protocol. Induced with Inj. Propofol 2 mg/kg, and then giving proper position Supraglottic airway devices are inserted. Both the airway devices were compared regarding ease of insertion, ease of NGT insertion and complications. **Observations and Results:** Out of 60, I-gel insertion was successful in 57 cases (95%) in first attempt, while PLMA was inserted successfully in only 49 cases (81.7%). NGT insertion was easy in 56 cases (93.3%) in I-gel group compared to 47 cases (78.3%) in PLMA group. Regarding complications blood staining of the devices were more with PLMA group (25%) compared to I gel group (6.7%) Conclusion: I-gel was more easy to insert with less complications compared to PLMA, also insertion of nasogastric tube was easy through I-gel.

Key Word: Supraglottic Airway Devices, I-gel, Proseal Laryngeal Mask Airway, Nasogastric tube

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INTRODUCTION

Securing airway and ventilation of patient is one of the most important responsibility of Anaesthesiologist during surgery. Though Endotracheal Tube is considered as gold standard for securing airway^{1,2}, new supraglottic devices like laryngeal Mask Airway, I-gel, Laryngeal tube etc. are also used successfully for this purpose³. They are having advantage of lesser stress response. The potential advantages of the I-gel are easy and rapid insertion and a reduction in the risk of pharyngeal tissue compression^{4,5,6}

Moreover, it has an inbuilt drainage channel, which allows the insertion of a gastric tube (maximum 14F gauge). The ProSeal laryngeal mask airway is in use since 1988. It is also used for management of the difficult airway. It has an elliptical mask on the distal end. It is designed to fit on the patient's hypopharynx and cover the supraglottic structures, thereby allowing relative isolation of the trachea.⁸ In the studies done by Singh *et al* and Kannaujia *et al* they found that I-gel is better supraglottic airway device than ProSeal laryngeal mask airway in that it is easier to insert and has minimal side effects.^{2,3,7} In the present study we compare these two supraglottic airway devices, I-gel and ProSeal laryngeal mask airway, in relation to the efficacy and associated complications in anaesthetized adult patients posted for surgeries under general anaesthesia.

MATERIALS AND METHODS

Institutional Ethical committee approval taken. Total 120 patients of age 18-65 years, of ASA grade I and II, posted for elective surgery were studied. Patients having difficult airway were excluded. Informed written consent was

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taken from patient. Selection of proseal laryngeal mask airway and I-gel was done according to the manufacturer's guidelines. Patient were grouped in two groups; group - I – I-gel, group - II – ProSeal laryngeal mask airway. Patient were given premedication in the form of inj. Ondansetron 0.1 mg/kg, inj. Midazolam 0.03 mg/kg, inj. Glycopyrrolate 0.04 mg/kg and inj. Fortwin 0.3 mg/kg IV. Patient were induced on inj. Propofol 2 mg/kg IV Then after giving proper positioning, PLMA/I-gel was inserted. In case of P-LMA, after insertion cuff was inflated with air and cuff pressure was maintained at 60 cm H₂O throughout the procedure using the cuff pressure monitor. Procedures were evaluated on the basis of following points-Ease of insertion - Number of attempts of insertion, Insertion time, ease of nasogastric tube insertion, Oropharyngeal leak pressure, Complications. The ease of insertion was determined by number of attempts for insertion, if it was done on first attempt it was considered easy, 2-3 attempts was considered difficult, if the device was not inserted even on 3 attempts then it was deemed failed and the airway was secured by endotracheal tube. Ease of Insertion of NGT was recorded. If the NGT was inserted in the first attempt then it was considered easy, on the second attempt was considered difficult and if it was not possible even on second attempt then it was considered failed. The oropharyngeal leak pressure in both the groups was measured by keeping the fresh gas flow at 3 litres per minute and closing the expiratory valve at 40 cm H₂O and looked for audible leak at mouth or by detection of audible noise using stethoscope placed just lateral to thyroid cartilage. Once the oropharyngeal leak pressure was confirmed, the expiratory valve was set at 20 cm H₂O. ProSeal laryngeal mask airway/I-gel was removed in deep plane of anaesthesia and any blood staining of the supraglottic airway and any tear of supraglottic airway was recorded. Patient were followed up every day upto 3 days for presence of hoarseness of voice, dysphagia (difficulty to swallow), dysphonia (difficulty to speak), sore throat, numbness of tongue and throat pain.

OBSERVATION AND RESULTS

There were 60 cases in each study groups, who were randomly selected keeping in mind inclusion and exclusion criteria. Group I is categorized as I-gel and Group II is categorized as ProSeal-LMA.

Table 1: Demographic Data

Variables	Group	N	Mean	SD	p-value
Age (yrs)	IGEL	60	54.23	+/-7.93	0.21
	LMA	60	52.24	+/-9.86	
Weight (Kg)	IGEL	60	62.88	+/-4.85	0.086
	LMA	60	61.30	+/-5.18	

Table 2: Comparison of Number of Attempts For Supraglottic Insertion Between Two Groups

No. of Attempts	Group		Total
	IGEL	LMA	
One	57(95%)	49(81.7%)	104(86.7%)
Two	3(5%)	11(18.3%)	16(13.3%)

P= 0.043

Table 3: Comparison Of Ease Of Supraglottic Airway Insertion Between Two Groups

Ease of Supra-glottic airway Insertion	Group		Total
	IGEL	LMA	
Difficult	3(5%)	11(18.3%)	14(11.7%)
Easy	57 (95%)	49(81.7%)	106(88.3%)

Table 4: Comparison of Ease Of Rt Insertion

Ease of RT Insertion	Group		Total
	IGEL	LMA	
Difficult	4 (6.7%)	13(21.7%)	17(14.2%)
Easy	56(93.3%)	47(78.3%)	103(85.5%)

p-value - 0.034

Table 5: Comparison of Oropharyngeal Leak Pressure Between Proseal Lma and I-Gel

	PLMA	I-gel
Mean	21.970	21.620
SD	0.940	1.170
p value	0.072	p value

Table 6: Comparison of Complications Between Two Groups

Complications	IGEL	LMA	Total	
Blood Staining	4 (6.7%)	15 (25%)	19 (15.8)	0.011
Hoarseness of voice	2 (3.3%)	5 (8.3%)	7 (5.8%)	0.44
Sore throat	3 (5%)	12(20%)	14(11.7%)	0.03

DISCUSSION

The laryngeal mask airway is a supraglottic airway device developed by British Anesthesiologist Dr. Archie Brain². ProSeal LMA improves upon the design of the cLMA, with better airway seal, having a second, posterior cuff, allowing for a higher oropharyngeal seal pressure of 27 cm H₂O³. The i-gel was invented by Dr. Muhammed Aslam Nasir, it provides a perilaryngeal seal without cuff inflation⁶. In our study, in 57/60 cases, I-gel was successfully inserted in first attempt, only 3 times second attempt was required, whereas in LMA-ProSeal first attempt was successful in 49/60 cases and 11 cases required a second attempt, In studies done by Brimacombe *et al*, Nolan *et al* and Keller *et al* comparing LMA-ProSeal with Classic LMA, they have observed lower first attempt insertion success with LMA ProSeal^{7,8}. The common reason which was stated was that when deflated, the semi-rigid distal end of the drain tube formed the leading edge of the LMA-ProSeal, which was more rigid as compared to the softer I-gel. This factor could contribute to the difficult insertion of LMA-ProSeal.⁹ The number of attempts to insert the devices is comparable to study done by Goyal *et al*.¹⁰ in which they

also concluded that I gel is easier to insert. In our study the mean insertion time for ProSeal LMA was 25.58 seconds and for I-gel was 23.32 seconds respectively. The insertion time in our study was comparable to the study done by Gasteiger *et al*¹¹ and stability of device despite changes in position of head and neck¹⁰². In our study, RT insertion was found to be easy in 56/60 cases for I-gel and 47/60 cases in ProSeal LMA. In a study done by sanket *et al*¹³, and Singh *et al* they also found sane findings. In our study the mean oropharyngeal leak pressure of PLMA was 21.97 and of I-gel was 21.62. The p value was 0.072, thus the result wasn't statistically significant. In contrast, study done by chauhan *et al*¹⁴, the mean airway sealing pressure in PLMA (29.55+/-3.53) was found to be significantly higher than I-gel group (26.73+/-2.52). The seal pressure in this mentioned study appeared to improve over time in a number of patients due to the thermoplastic properties of the gel cuff, which may form a more efficient seal around the larynx after warming to body temperature. In our study, in the I-gel group 5% cases complained of sore throat immediately in the postoperative period whereas in the LMA-ProSeal group 20% patients complained of sore throat. The difference was statistically significant ($P < 0.05$). Soliveres *et al*. also found that the use of LMA-ProSeal produces more sore throat as compared to the I-gel. Studies done by Helmy *et al*, Gatward *et al* and Keijzer *et al* have reported similar findings wherein the incidence of sore throat is minimal with I-gel in comparison with other supraglottic airway devices.^{9,137,138,139}. Furthermore, when we compared the blood staining between ProSeal LMA and I-gel, we found the difference to be statistically significant, with a P value of 0.011. In total, In study done by park *et al*⁵⁰ Hughes *et al*¹⁵, Beringer *et al*¹⁴ an 11% overall complication rate during various stages of the anesthetic with I-gel. With LMA ProSeal, Wheeler¹⁵ reported no cases of laryngospasm and Lopez-Gil *et al*¹⁴ reported 2 cases of airway reflex activation and bronchospasm. They had 3 cases of blood staining with LMA ProSeal, similar to other reports given by Goyal *et al* and Mitra *et al*.¹⁶ Singh *et al*² reported a higher occurrence of blood staining and oral trauma with the LMA ProSeal compared with i-gel, although not statistically significant. When comparing hoarseness of voice as a complication between the two groups, the result was shown to be statistically not significant with 2 patients in the I-gel group and 5 patients in the ProSeal lma group presenting with the complain post operatively.

The post operative complications of hoarseness of voice, dysphonia, dysphagia, tear of supraglottic airway, throat pain and numbness of tongue didn't present in any of the patients of either groups.

CONCLUSION

I-gel was easier to insert with less complications compared to PLMA, also insertion of nasogastric tube was easy through I-gel compared to PLMA.

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