Original Research Article

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Comparison of Clinical Performance of I-Gel With Proseal Laryngeal Mask Airway in Surgical Procedures

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Abstract

Context: LMA is devised as a substitute for the face mask and alternative for endotracheal Intubation. Aims: The objective of the study is to compare I-Gel and Proseal LMA. *Settings and Design:* Randomise prospective comparative study. *Methods and Material:* study was conducted on 72 patients of age group 18-60 years with ASA I /II of either sex, admitted for elective surgery done under GA. All patients were pre-medicated with i.v Glycopyrrolate and Fentanyl. Preoxygenated for 3 mins.Induced with i.v Propofol and Scoline. Group A- Proseal LMA Group B- I-Gel was inserted Statistical analysis used: The collected data was coded in excel spread sheet. Demographic data,was analyzed withunpaired independent student's T test. p values < 0.05 is considered statistically significant. Fisher's exact test or Chi-square was used to compare categorical data. *Results:* The mean airway leak pressure of the Proseal group was 30 cm H2O and significantly higher than I-Gel 23 cm H_2O. There was no statistical difference in the ease of insertion in both the devices. The overall success rate was 100%. The mean insertion time was significantly less for I-Gel (14s) when compared to Proseal (24s). The gastric tube could be inserted easily in all the cases The hemodynamic response was comparable between the two groups. *Conclusions:* We conclude that Proseal has a higher airway leak pressure of 30cm H20 compared to I-Gel (23cm H2O) enabling positive pressure ventilation at higher pressures and therefore for a wider spectrum of patients. However, I-Gel is better than Proseal in terms of faster and easier insertion.

Keywords: Airway Sealing Pressures, I-gel, Proseal

Introduction

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The inventor of the "classic LMA", Dr. Archie Brain, devised it as a substitute for the face mask ventilation and Intubation.[1]

Compared to face mask ventilation it enables a relatively "hands-free" method for a leak-free airway and is also less probable to cause gastric insufflations which is a common complication with face mask ventilation.[2]

Securing the patients airway with an endotracheal tube is still the gold standard.[3]

However, this manoeuvre requires skills, continuous training, and practice and usually Requires Direct Laryngoscopy Producing Reflex Sympathetic Stimulation and Can Also Cause

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Laryngo - Pharyngeal Trauma.[4, 5]

For all these Reasons, The Asa Has Endorsed Lma as a Rescue Airway, and as a First-Line Airway Management in Those With Limited Airway Management Experience.

Due to the low-pressure seal of LMA when the airway pressure increases above the pharyngeal seal (during controlled ventilation), ventilating gas is lost, leading to a risk of hypoventilation, environmental pollution, and drug wastage.[6]

Equally important, a larger proportion of this leaking gas enters the oesophagus and stomach, likely increasing the risk of regurgitation and aspiration.[6]

To get over the above-said problems in the year 2000 Dr. Archie Brain designed the LMA Proseal with certain modifications targeted to separate Gastro-intestinal tract from the respiratory tract and to increase airway sealing pressure allowing positive pressure ventilation and airway protection.[7,8]

I-gel was developed by Dr. Mohammed Aslam Nasir. Its non-inflatable cuff is soft, gel like and is anatomically designed to fit in the supraglottic space.[9, 10]

A gastric tube channel is placed lateral to the airway.

This study was outlined to practically compare the performance of I-gel and Proseal LMA in elective surgeries.

Aims and Objectives

The objectives of the current study are to compare two supraglottic airway devices, I-gel and LMA Proseal in patients posted for elective surgeries under General Anesthesia in terms of:

1. Airway leak pressure.
2. Number of attempts for insertion.
3. Time taken for the device placement.
4. Ease of insertion of gastric drain tube.
5. Hemodynamic changes.

Materials and Methods

A randomized prospective study was conducted on 72 patients of age group 18-60 years with ASA I /II of either sex, admitted for elective surgery done under GA. All patients were pre-medicated with i.v Glycopyrrolate and Fentanyl. Preoxygenated for 3 Mins. Induced with i.v Propofol and i.v. Succinylcholine.

In group A- Proseal LMA was inserted

In group B- I-Gel was inserted

Statistical analysis used

The collected data was coded in excel spread sheet.

Demographic data,was analysed withunpaired independent student's T test. p values < 0.05 is considered statistically significant.

Fisher's exact test or Chi-square was used to compare categorical data.

Qualitative data is presented in the form of Proportions and pie diagrams, barcharts is used to represent graphically.

Quantitative data is presented as meanand standard deviation.

Results

The mean age, Gender and BMI distribution in both groupswere comparable and there was no statistically significant difference between.

The mean airway pressure in the Proseal group was 30.75cm H_2O compared to 23.28cm H_2O in the I-Gel group. The p-value was <0.001 and is statistically significant (Table 1).

The mean insertion time for Proseal placement was 26.17 compared to 14.33 in the I-Gel group. The *p*-value in <0.001 and is statistically significant (Table 2).

In both, Proseal and I-Gel group the placement of the airway device was done successfully in the first attempt. Effective ventilation was possible in all cases.

Out of the 36 cases, the drainage tube could be easily inserted in all the cases in Proseal group grading it easy. In the I-Gel group also drainage tube could be easily inserted in the first attempt in all the 36 cases. In none of the cases, was there any failure to insert it (Tables 3 and 4).

When compared between the two groups, there was no statistically significant difference in terms of Pulse rate, Systolic, Diastolic or Mean Arterial Blood Pressure and Arterial saturation (Figs. 1-4).

Table 1: Airway Leak Pressure Distribution in between the two groups

Airway leak pressure (cm H_2O)	Proseal	I-GEL
11-20	0	11
21-30	19	23
31-40	17	2
Total	36	36
Mean ± SD	30.75±4.38	23.28±4.26

Table 2: Insertion Time Distribution in between the two groups

Insertion Time(s)	Proseal	I GEL
1-10	0	1
11-20	0	35
21-30	30	0
31-40	6	0
Total	36	36
Mean ± SD	26.17±3.33	14.33±2.23

Table 3: Insertion Attempts in between the two groups

Insertion Attempts	Proseal	I GEL
Nil	0	0
1	36(100%)	36(100%)
Total	36	36

Table 4: Ease Of Insertion of Gastric Drainage Tube in between the two groups

Group	Number	Easy	Difficult	Failure
Proseal	36	36	0	0
I-Gel	36	36	0	0

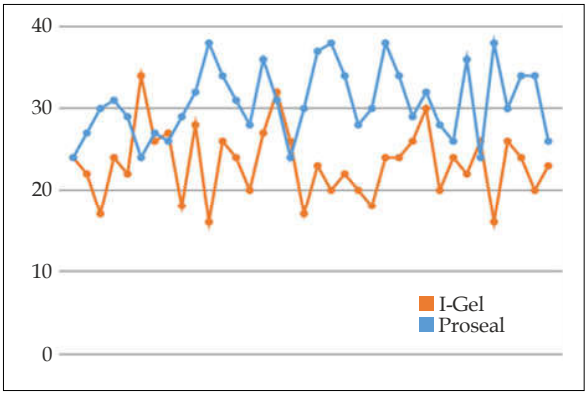

Fig. 1: Graph of airway sealing pressure between the two groups.

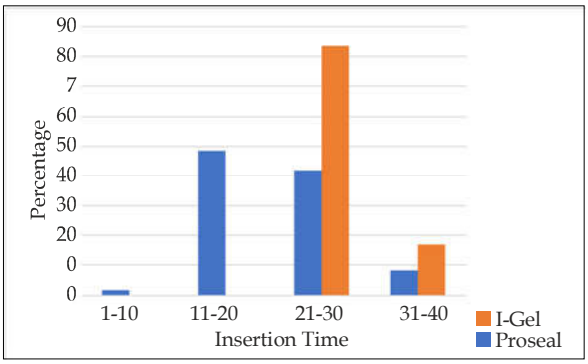

Fig. 2: Graph of Insertion time of LMA between the two groups

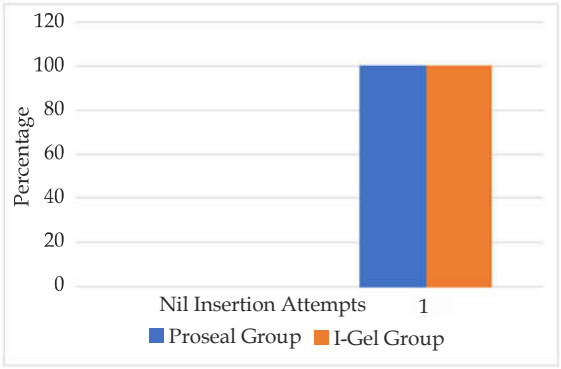

Fig. 3: Graph of insertion attempts between the two groups

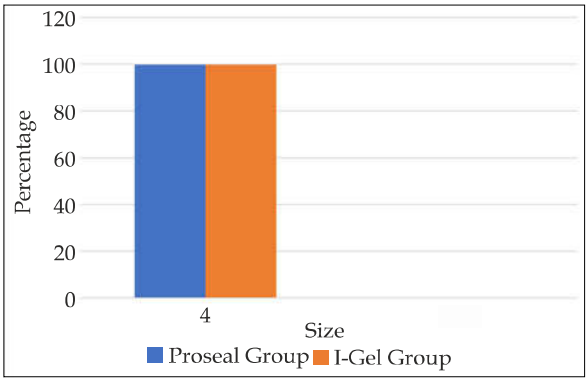

Fig. 4: Graph of Ease of Insertion of NG tube between the two groups

Discussion

In our study the mean age, weight, BMI and sex ratio were comparable among both the groups.

The mean airway leak pressure of the Proseal group was 30 cm H_2O and was significantly higher than I-gel-23 cm H_2O.

The large capacity of Proseal may result in the increased seal pressure by enabling the walls of the cuff to conform with the contours of the pharyngo-laryngeal structures more effectively.[12]

Its potential advantages include minimal risk of tissue compression whereas supraglottic devices with inflatable cuff can absorb anaesthetic gases leading to increased mucosal pressure.[13]

Some studies showed that the sealing pressure of I-Gel improved over time probably due to the warming of the thermoplastic cuff to the body temperature which was not compared in this study.[14]

In our study there was no statistical difference in

the ease of insertion in both the devices. The overall success rate was 100%.

But studies like Singh A et al. showed I-Gel was easier to insert and this may be because the I-Gel insertion does not require the finger into the oral cavity as the device is simply pushed into place.

Single attempt was sufficient to insert both the devices.

This may be due to our prior experience with the devices.

In our study the mean insertion time was significantly less for I-Gel (14s).

In one study it reasoned this difference due to no cuff inflation requirement in the I-gel consequently shorter time required to achieve an effective airway.[14]

Similar studies done showed the gastric tube could be inserted easily in all the cases of both the group in our study.[15]

The hemodynamic response recorded at insertion and at one, three, and five minutes was comparable between the groups, with no statistical significance.

Conclusion

Based on the results of our study we conclude that Proseal has a higher airway sealing pressure of 30cm H_2O enabling positive pressure ventilation at higher pressures and therefore for a wider spectrum of patients when compared to I-Gel which has an acceptable airway leak pressure of 23cm H_2O. However, I-Gel is better than Proseal in terms of easy and faster insertion better suited as for rescue ventilation.

Key Messages: Proseal must be preferred when ventilating a patient in surgical procedures whereas I-gel is better as a rescue device**.**

Conflict of Interest: Nil

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