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Research Article

COMPARISON OF PERFORMANCE OF I GEL WITH CLASSICAL LARYNGEAL MASK AIRWAY IN SPONTANEOUSLY BREATHING CHILDREN UNDERGOING ELECTIVE SURGERY - IN TERMS OF INSERTION SUCCESS RATE

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A B S T R A C T

Background: Supra glottic airways are commonly used as alternatives to face mask anaesthesia. These supraglottic airway devices are easier to use than face masks and are less invasive than endotracheal tubes. Supraglottic airways help to maintain a patent airway during surgical procedures. Laryngeal mask airways and I-gel airways are commonly used supraglottic airway devices in children. The aim of this study was to compare the performance of I- gel and classical laryngeal mask airway in terms of the number of attempts made before securing a patent airway in children under general anaesthesia.

Methods: This study was done in 100 children aged between 2-10 years, weighing 10-25 kg, ASA physical status I - II and scheduled for elective surgeries. Children were divided into two groups (I-gel and LMA Groups) of 50 children each. A standard protocol of anaesthesia was followed. Regional anaesthesia (caudal epidural block) was used for intra operative and post operative analgesia in all children. Number of attempts of insertion of I-gel and classic laryngeal mask airway were noted before securing a successful patent airway.

Data analysis was done by SPSS Software Version 18. Qualitative data were compared by using Chi-square test and quantitative data was compared using independent t-test. A P value less than 0.05 was taken as statistically significant.

Results: Demographic data were comparable in both I-gel and classic laryngeal mask airway groups. The success rate for first attempt was 100% for I-gel airways and 96% for classic laryngeal mask airways. We did not find a statistically significant difference in insertion success rate between I- gel and classic laryngeal mask airway (P = 0.153). Both airways were comparable in terms of insertion success rate.

Conclusion: We found more insertion success rate clinically in I-gel airway group compared to classic laryngeal mask airway group. But this insertion success rate was comparable between I-gel and classic laryngeal mask airway in spontaneously breathing children.

INTRODUCTION

Supraglottic airways are successfully used to maintain a patent airway in children. The commonly used supraglottic device is LMA classic [1] LMA (Laryngeal Mask Airway) was first introduced by Archie Brain, in 1988. It is inserted blindly into the pharynx with index finger. Laryngeal mask airway forms a low pressure seal around the laryngeal inlet [2, 3]. Insertion of the LMA classic is little difficult in children compared to adults [4].

The I-gel is a supraglottic airway with a non-inflatable cuff made of medical grade thermoplastic elastomer. It has a port for gastric tube placement [5,6,7]. I-gel is easier to insert, with minimal risk of tissue compression and stability after insertion. [8] The firmness of the tube and its natural oropharyngeal curvature allows the I-gel to be inserted by grasping its proximal end .[9]

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Table 1 Different sizes of LMA

Weight, kg	Mask Size	Max Cuff Volume, ml
< 5	1	4
5-10	1.5	7
10-20	2	10
20-30	2.5	14
30-50	3	20
50-70	4	30
70-100	5	40
>100	6	50

In the present study we compared I-gel and classical laryngeal mask airway in children for insertion success rate in first attempt prior to securing the patent airway.

Table 2 Different sizes of I Gel airway

Size	Weight
5	90+ kg
4	50-90 kg
3	30-60 kg
2.5	25-35 kg
2	10-25 kg
1.5	5-12 kg
1	2-5 kg

METHODS

This study was conducted in 100 patients undergoing elective surgeries after getting approval from the Institutional Research Committee (IRC) and Institutional Ethical Committee (IEC).

Written informed consent was taken from all the parents. Children undergoing elective surgeries of short duration in Government medical college, Kozhikode in from June 2016 to June 2017 were included in this study.

Inclusion Criteria

1. Children of ASA class I - II
2. Children between 2-10 years of age
3. Children undergoing elective surgeries

Exclusion Criteria

1. Children with difficult airway
2. Children with cervical spine disease
3. Children with hiatus hernia, gastro esophageal disease

All the children were fasting as per standard guidelines. They were pre-medicated with 0.3mg/ kg oral midazolam.

The children were induced with oxygen and 8% Sevoflurane with standard monitors placed and then intravenous access was established; 1-2 microgram/ kg Fentanyl was administered and anaesthesia was maintained with O_2, N_2O and Sevoflurane. Once adequate depth of anaesthesia was achieved the supraglottic device was inserted and regional anesthesia (caudal block) was given for intra operative and post-operative analgesia.

Heart rate, non invasive blood pressure, oxygen saturation and end tidal CO_2 were recorded before induction and 1 and 5 minutes after insertion of device and then at every 5 minutes interval till the end of surgery. The number of insertion attempts was recorded. The outcome measured was the number of attempts of insertion of I-gel airway in Group 1 and classic laryngeal mask airway in Group 2.

Statistical analysis of the data was done using Statistical Package for the Social Sciences (SPSS) software version 18. Qualitative data were compared using Chi-square test. Quantitative data were compared using the independent‘t’ test. P value of less than 0.05 was taken as statistically significant

RESULTS

A total of 100 children were included in the present study with 50 patients in Group 1 and 50 patients in group 2. The demographic data were comparable between the two groups. Insertion attempts were noted prior to securing the airway. All the 50 children of Group 1 had a successful insertion at first attempt with I-gel airway with a success rate of 100%. 48 out of 50 children of Group 2 had a successful insertion at first attempt with classic laryngeal airway with a success rate of 96%. Statistically significant difference was not observed between Group 1 and Group 2 (P= 0.153).

Insertion Attempts

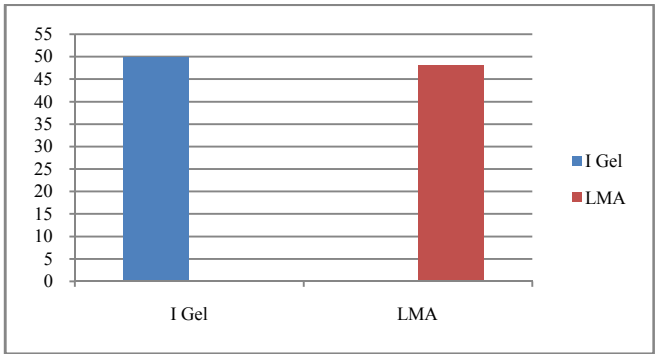

Fig 1 Comparison of successful insertion of I-gel and classic LMA.

In I-gel group the first attempt was successful in all the 50 patients and the insertion success rate for the first attempt was 100%. In Classic LMA group the first attempt was successful in 48 out of 50 patients and the success rate for first attempt was only 96%. (P=0.153)

DISCUSSION

I-gel is a supraglottic device with a non inflatable cuff designed to be used during anaesthesia. [10] It is a latex device and is made of a gel-like medical grade thermoplastic elastomer. This device contains an epiglottis blocker, which helps to prevent epiglottis from folding or obstructing the laryngeal inlet. The soft non-inflatable cuff seals against the peri- laryngeal structures. I-gel has a gastric channel which allows venting of the air and gastric contents and insertion of gastric tube. [11]

We found that insertion of I-gel was successful (100%) on the first attempt in all cases of I-gel group and that insertion of classical laryngeal mask airway was successful in 48 out of 50 (96%) cases in classical laryngeal mask airway group. Richez *et al* [12] found that the insertion success rate was 97%. A study conducted by Kim MS [13] *et al* reported higher first attempt insertion success rate with the I-gel airway compared to classic laryngeal mask airway in infants. Both these study results are consistent with our results.

Supraglottic airway devices are important to provide anaesthesia for short surgical procedures in children. Even though we noticed a high success rate in I-gel airway, both I - gel airway and classic laryngeal mask airway are comparable in terms of insertion success rate on the first attempt.

CONCLUSION

The insertion of I- gel was successful in the first attempt in all I-gel group with 100% success rate. The insertion success rate for classic laryngeal mask airway was only 96%. Successful first attempt for insertion was comparable between I-gel and classic laryngeal mask airway in spontaneously breathing children.

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