



A COMPARATIVE STUDY OF I-GEL V/S LMA FOR PEDIATRIC PATIENTS

Anaesthesiology

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ABSTRACT

Supraglottic airway devices have become popular fixture and commonly used to manage airway in children because they are typically easy to use and they avoid problems specific to tracheal intubation. We did a prospective, randomized; single blind study comparing clinical performance of paediatric I-gel and classic LMA (cLMA). The study included 60 patients, aged 1-12 years, 30 patients in each group those who were scheduled for planned surgery under general anaesthesia. Number of insertion attempts, ease of insertion and intra-operative and post-operative complications were observed. Pulse rate and blood pressure were recorded done before and after induction and at 3 and 5 minutes after insertion of device. We observed that compared to classic LMA, I-gel is easy to insert while number of attempt required and hemodynamic parameters are comparable in both groups. Complications were minor and comparable.

KEYWORDS:

classic LMA, I-gel, paediatric

INTRODUCTION

Management of airway, breathing and circulation has always remained a challenge to science, especially in anaesthesia. Most vital element in providing functional respiration is the airway. (1,2) Supraglottic airway devices are commonly used to manage children's airways because they are typically easy to use and they avoid problems specific to tracheal intubation. (3,4)

The paediatric I-gel is a new single use latex free supraglottic airway device for children. It is smaller model of I-gel device used in adult with non-inflatable cuff and a channel for gastric catheter. (5, 6) Studies have been published but for paediatric I-gel, very few data are available. Many studies have shown their superiority over intubation. So, we did this study to compare clinical performance of two available supraglottic devices at our institute namely I-gel and classic LMA in paediatric patients.

Method:

This study of cLMA and I-gel for paediatric patients was carried out after approval of Institutional Ethics Committee. This was a prospective, randomized; single blind study. Written informed consent was taken from the parents. The patients were assigned to receive either i-gel or cLMA by computer generated random number table. Blinding was ensured with closed envelopes. The children and parents were unaware of the airway device used. Paediatric age from 1 year to 12 years and patients scheduled for planned surgery under general anaesthesia were enrolled in study. The exclusion criteria were- those at risk of aspiration (non-fasted, gastro oesophageal disease (GORD), gastrointestinal stenosis), difficult airway, pre-operative sore throat or clinically apparent upper respiratory tract infection (URTI), and refusal to participate.

Intravenous premedication with inj. glycopyrrolate 4 µg/kg IV, inj ondansetron 50 µg/kg and inj. paracetamol 15mg/kg was given. Induction of anaesthesia was done with propofol 2mg/kg and ketamine 0.5 mg/kg according to patient's weight. Patients were monitored with SpO₂, ECG & non-invasive blood pressure (NIBP). After loss of eyelash reflex, bag mask ventilation was given if the patient is apnoeic. I-gel/cLMA was inserted by anaesthesiologist with at least two years of experience. Failure of device is defined as three failed insertion attempts. If insertion of both devices failed, the airway was secured according to decision of anaesthesiologist. Maintenance of anaesthesia was done with O₂ + N₂O + Inhalational anaesthetic agent (halothane/isoflurane/sevoflurane) + Non-depolarising neuromuscular blocking agent Inj. Vecuronium/inj. atracurium + IPPV. Reversal was

done with inj. Glycopyrrolate 8 µg/ kg IV and inj. Neostigmine 50 µg/ Kg IV. Extubation done after adequate spontaneous respiration, adequate motor tone and power. The patient's parents during post-operative assessment were asked about the symptoms of sore throat, hoarseness, and dysphagia, numbness of tongue, nausea and vomiting. Patients were observed in post-operative period for following complications: Laryngospasm, Bronchospasm, Soft Tissue Trauma, Blood on Device, Sore Throat, Dysphagia and Dysphonia.

Sample size calculation was based on our primary outcome variable, number of insertion attempts. Considering α error = 0.05 and power of the study 90%. Considering dropouts 30 patients in each group were enrolled.

Statistical analysis: Data was summarized as number (%) or mean+ SD/mean (range) as appropriate. All the data were recorded in Microsoft Excel 2007.

Mean as well as Standard Deviation (SD) were calculated. Statistical difference between two groups was determined using "unpaired student t test" except for attempts of insertion and ease of insertion. For ease of insertion "Median test for two population" was used and for attempts of insertion "chi-square test" was used. A "p" value <0.05 was considered as significant and "p" value <0.001 was considered as highly significant.

RESULTS

Total 60 cases were studied, 30 cases in each group of classic LMA and I-gel. The demographics were comparable in both groups as shown in table 1.

Table 1. Baseline characteristics of the patients undergoing anaesthesia with the I-gel or LMA Classic. Values are mean (SD).

	Group A(n=30)	Group B(n=30)	P value	Significance
Age	5.566±2.55	6.23±3.42	0.36	Not Significant
Weight	15.7±4.61	15.86±4.63	0.88	
Male: Female	21:9	22:8		

Number of attempts required for insertion were more in group cLMA than in group I-gel but were not statistically significant and ease of insertion was better with I-gel compare to cLMA and the difference was statistically highly significant, as shown in table 2.

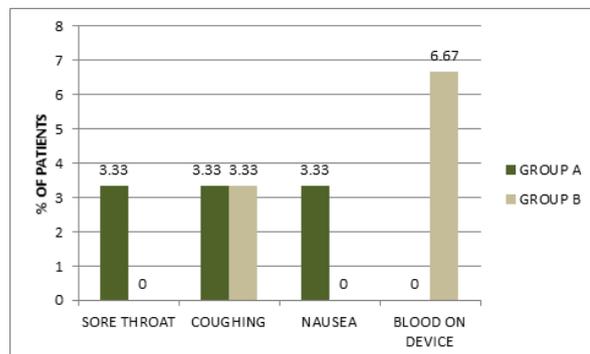
Table 2 Insertion characteristics in patients undergoing anaesthesia with the I-gel or LMA Classic. Values are number (proportion)

	Group-A	Group-B	P-value	Significance
Attempts				
1	29	27	0.60	Not significant
2	1	3		
Ease of insertion Score				
1	29	11	8.2e-7	Highly significant
2	1	18		
3	0	1		
4	0	0		

*Ease of insertion was graded as 1: no resistance, 2: mild resistance, 3: moderate resistance, 4: inability to place the device (11)

Complication rate was minor in both groups, in the I-gel group compared with the LMA Classic group 3.33% developed sore throat, nausea and coughing whereas in classic LMA group only coughing in 3.33% and blood on device in 6.67% was seen, as shown in graph 1.

Graph 1: Complications characteristics in patients undergoing anaesthesia with the I-gel (Group A) or LMA Classic (Group B). Values are percentage



DISCUSSION

Since the introduction of the Laryngeal Mask Airway Classic, various devices have been developed, the safety and efficacy of which have been established in adults and children(7)These supraglottic airway devices may be an alternative in difficult airway management (8)The paediatric I-gel is new, and I-gel has been extensively studied in adults and is generally regarded as a viable alternative to the LMA Classic. These devices have very few studies in children. Both have gained popularity for airway management in both anaesthesia and resuscitation due to its ease of use.

In our study, there was a higher first attempt insertion success rate with the I-gel than the LMA Classic; this did not reach statistical significance. M.-S. Kim et al did a randomised comparison of the I-gel and the Laryngeal Mask Airway Classic in infants. They observed that success rate at first insertion attempt was 100% (27/27) in the I-gel group compared with 88% (23/26) in the LMA Classic group.

We found that the I-gel could be inserted more easily compared with the LMA Classic and observed that there was significant difference in ease score of insertion in patients in I-gel group than patients of cLMA group. It is observed that in I-gel group 29/30 (96.66%) and cLMA group 11/30 (36.66%) there was no resistance felt whereas moderate resistance was felt in Group cLMA i.e. 6/30 (36.66%) and in Group I-gel 1/30(3.33%). According to the first observational study of the paediatric I-gel by Beylacq et al. the I-gel could be inserted very easily in most cases (90%) and no experience was required to obtain a high first attempt success rate.

In our study complications were minor and comparable, we observed that one patient(3.33%)of children in I-gel group developed sore throat, nausea and coughing as compared to cLMA group in whom there was no complications like sore throat or nausea but one patient(3.33%) developed coughing. In cLMA group, blood on device was seen in two patients(6.67%)of children as compared to I-gel group in whom it was not seen. G. J. Choi in their study “a systematic

review and meta-analysis of the I-gel vs. Laryngeal mask airway” in children concluded that in classic LMA blood on the device was seen as compared to I-gel no blood on device was seen. It is similar to our study but according to their study there was no significant difference in rate of complications except for blood on device (7)

In our study results we observed hemodynamic profile of both groups were comparable similar to a study done by Bikramjit Das et al. They studied Comparison of I-gel supraglottic airway with cLMA in anaesthetised paralysed children undergoing elective surgery. They included 60 ASA grade I–II patients undergoing lower abdominal, inguinal, and orthopaedic surgery. The patients were randomly assigned to I-gel and cLMA groups (30 patients in each group) concluded that hemodynamic parameters were comparable in both groups (9)

Conclusion:

I-Gel and classic LMA are acceptable alternatives to endotracheal intubation for airway management in paediatric patients. Compare to cLMA, I-gel is easy to insert while number of attempt required are comparable. There is no failure rate for any of the two devices studied. Haemodynamic parameters were comparable in both groups. Complications are minor and comparable in both the groups.

Thus, for anaesthetic management of paediatric patients, I-gel or cLMA should be first line of airway management I-gel being easier to insert compare to cLMA.

REFERENCES

1. Dheer Singh, Urvashi Yadav, Manoj Kumar, Prashant K. Mishra, Comparative Study of Hemodynamic Responses to Airway Maintenance Devices: Proseal LMA V/S I-GEL Airway, JMSCR Volume|2||Issue|6||Page 1320-1328||June 2014
2. Fox EJ, Sklar G.S., Hill O.H., Vilanour R., King B .D. Complications related to the pressor response to tracheal intubation, Anaesthesiology 1977; 47:524-525.
3. Levitan R.M, Kinkle W.C.Initial anatomic investigations of the I-gel airway: a novel supraglottic airway without inflatable cuff. Anaesthesia.2005; 60: 1022-1026.
4. Brain AII, Varghese C, Strube PJ. The LMA “ProSeal”—a laryngeal mask with an oesophageal vent. Br J Anaesth 2000; 84:650– 654.
5. Sebastian G. Russo, Stephan Crèmes, Tamara Galli, Christoph Eich, Anselm Brauer, Thomas A Crozier, Martin Bauer, Miche Strach, Randomised comparison of the i-gel, LMA supreme and the laryngeal tube suction-D using clinical and fibreoptic assessments in elective patients, BMC anaesthesiology 2012, 12:18
6. Lorenz G. Theiler, M.D., Maren Kleine-Brueggeny, M.D.,† Barbara Luepold, M.D.,‡ Franziska Stucki, M.D.,§ Stefan Seiler, M.D.,§ Natalie Urwyler, M.D., Robert Greif, M.D., M.M.E.#, Performance of the Paediatric-sized I-gel Compared with the Ambu Aura Once Laryngeal Mask in Anesthetized and Ventilated Children, 2011, the American Society of Anaesthesiologists, Inc. Lippincott Williams & Wilkins. Anaesthesiology 2011; 115:102–10
7. G. J. Choi, H. Kang, C. W. Baek, Y. H. Jung, Y. C. Woo and Y. J. Cha, A systematic review and meta-analysis of the I-gel vs. laryngeal mask airway in children, Anaesthesia 2014, 69, 1258–1265 doi:10.1111/anae.1274
8. Kus A., Gok N.C., Hosten T., Gurkan Y., Solak M., Toker K., Comparison of LMA-Supreme and I-gel in children: difficult airway scenario, airway management, 19A33-9
9. Bikramjit Das, Subhro Mitra, Arijit Samanta, and Bhavani S. Vijay, Comparison of i-gel™ supraglottic device with classic laryngeal mask airway in anesthetized paralyzed children undergoing elective surgery, Anesth Essays Res. 2012 Jul-Dec; 6(2): 180–183.
10. Beylacq L, Bordes M, Semjen F, Cros AM. The I-gel, a single use supraglottic airway device with a non-inflatable cuff and an oesophageal vent: an observational study in children. Acta Anaesthesiologica Scandinavica 2009; 53: 376–9.
11. M.-S. Kim, J.-T. Oh, J. Y. Min, K.-H. Lee and J.-R. Lee, A randomised comparison of the i-gel™ and the Laryngeal Mask Airway Classic™ in infants, Anaesthesia 2014, 69, 362–367 doi:10.1111/anae.12592.