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Research Article

A COMPARATIVE STUDY BETWEEN TWO SUPRAGLOTTIC AIRWAY DEVICES: I GEL VS CLASSIC LARYNGEAL MASK AIRWAY IN A TERTIARY CARE

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Abstract:

Objective: to secure airway, devices of supraglottis airway are better for children and adults than tracheal intubation during anesthesia. In this study, modern i-gel is compared with standard laryngeal mask airway with respect to ease of device insertion, proper placement, maintenance of ETCO₂ and SPO₂, complications raised before and after operation.

Design of Study: in this study, comparison is done.

Material and methods: These clinical tests and trials conducted in Allama Iqbal Memorial Hospital Sialkot from Jan 2018 _Jan 2019 in which 120 patients were selected including both males and females in between 5-60 years and range of ASA grading is from I-III. Under anesthesia, operation of all patients was done in supine position. All the patients received medication before induction of anesthesia. Agents included in anesthesia are injection and Propofol 2-3 mg/kg. To secure airway of patient, LMA and i-gel is used in position of "sniffing air". Monitoring of device placement is done by chest expansion, audible leak absence, capnography and SPO₂ >95%. All the patients are checked with respect to following parameters like ease of device insertion, duration of insertion, complications raised before and after operation and hemodynamic alternations.

Results- in terms of statistics, there is no proper difference in between both groups of patients with respect to heart rate, BP, ETCO₂ and SPO₂. But it is noted that the time of insertion in LMA method is greater than i-gel method.

Conclusion- In this study it was concluded that best replacement device is I-gel rather than LMA due to its ease of insertion and minimum complications raised before and after operation.

Keywords: LMA, Advantages, I-gel, Disadvantages

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INTRODUCTION:

In 1880, endotracheal intubation was invented and it was one of the best inventions in the management of airways. Airway approach of supraglottic is developed by this invention. For tracheal intubation, requirement of continuous training and professional skills is important.

In tracheal intubation, laryngopharyngeal lesions might be caused by direct laryngoscopy. Hypertension is also caused by tracheal intubation raised in plasma catecholamine and sympathetic stimulation, intracranial hypertension and ventricular arrhythmias is generated by it. As there are so many disadvantages of tracheal intubation, so maintenance of airways during anesthesia is done by supraglottic airway device in children and adults. Laryngeal mask airway (LMA) was used in 1981 for airway management. In this modern era, another device known as i-gel is also used. Soft gel with cuff is present in i-gel composition.

Non inflatable seals of all structures are made by making the design and structure of I-gel such as laryngeal tissue and pharyngeal. Advantages of i-gel is more and given as ease of insertion, more stability, less compression of tissues and economical as well. At the same time, LMA has numerous disadvantages such as difficult device insertion, difficult to handle, chances of tissues injuries, risks related to pulmonary aspiration and controlled ventilation. So, it is inferior than i-gel.

This case study is totally dealing with the comparison of I-gel and LMA insertion devices of airways and some trails have also done for hemodynamic parameters judgement, complications while insertion, complications (intra operative and postoperative) and maintenance of ETCO₂ and SPO₂.

MATERIAL AND METHODS:

This was a random study which was conducted after getting the approval from ethical committee and related to the comparison of two different devices of airways known as LMA and I-gel. In this clinical tests and trials, under anesthesia, 120 patients were selected including both males and females in between 5-60 years, range of weight is from 10kg to 75kg and range of ASA grading is from I-III. Some patients were then not considered as they were pregnant, having hiatus

hernia, full stomach, neurosurgery, ASA grade 4 and if they were emergency patients. A patient is completely checked before going through surgery. According to the weight of patient, both LMA and i-gel devices are available. As preoxygenation, a patient is fed up with oxygen for almost 3 minutes. Injections of ondansetron and glycopyrrolate were given to patients before operation. All the patients are checked with respect to following parameters like ease of device insertion, duration of insertion, complications raised before and after operation and hemodynamic alternations. Agents included in anesthesia are injection and Propofol 2-3 mg/kg. To secure airway of patient, LMA and i-gel is used in position of "sniffing air". Monitoring of device placement is done by chest expansion, audible leak absence, capnography and SPO₂ >95%. Patients are classified into two groups on the basis of device and names of groups are LMA and I-gel. In i-gel group, airways are secured by I-gel, but in other group, LMA is used in place of I-gel. Gastric tube was channelized into stomach through gastric channel in i-gel group. Some important points which are noted in both methods are duration of insertion, no. of attempts to insert successfully, complications while inserting and removing devices etc. These airways devices are attached to the anesthesia machine's breathing circuit. 50% nitrous oxide, isoflurane, oxygen and injection of atracurium is used to achieve anesthesia of patients. Dose of Glycopyrrolate and neostigmine is used to reverse blocking agent of neuro muscular at the end of procedure. After the achievement of desired tidal volume, airway device is then removed.

After surgery, all the patients are observed with respect to hypertension, bradycardia and hypercarbia. Patients are also observed for cough, breath holding, tough numbness, lip injuries, larynx spasm, dental injuries and blood on devices after operation. Unpaired t test is used in the analysis of data and value of p is less than 0.05 by software and graph.

RESULTS:

Once the data is completely observed, then results of this study revealed that no significant difference is observed in between two groups in terms of statistics and demographic data like weight, sex, ASA grading, age and surgery duration. Table 1 is used to describe this.

Table 1. Demographic data

Demographic Data		Group i-gel N=60 (%)	Group LMA N=60 (%)	P value
Age (years) Mean \pm SD		21.09 \pm 15.0	21.19 \pm 17.90	0.579
Sex(%):	Male	42(70%):18	45(75%):15	0.501
	Female	(30%)	(25%)	
Weight (Kg) Mean \pm SD		44.60 \pm 19.10	40.54 \pm 19.31	0.440
ASA: Grade(%)	ASA-I	09(15%)	09(15%)	0.667
	ASAI	40(66.6%)	45(75%)	
	ASA III	11(18.4%)	06(10%)	
Duration of Surgery (Minutes) Mean \pm SD		40.1 \pm 8.11	42.2 \pm 6.16	0.161

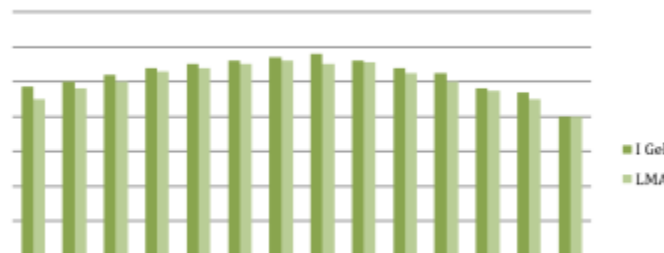
Types of surgeries in both methods are not that much different and given in table 2.

Table 2. Surgery Type

Surgery	Group i-gel	Group LMA
	N=60(%)	N=60(%)
Contractor Release and STG	18(30%)	21(35%)
Diagnostic scopy	06(10%)	06(10%)
Circumcision and Hypospadias Repair	12(20%)	05(8.3%)
Excision biopsy for Fibroadenoma	06(10%)	09(15%)
I&D, Debridement, Resuturing	12(20%)	13(21.7%)
Fistulectomy, Haemorrhoidectomy	06(10%)	06(10%)

In figure 1 and 2, difference of hemodynamic b/w both groups are explained as there is no significant difference.

Fig. 1. Changes in systolic and diastolic BP



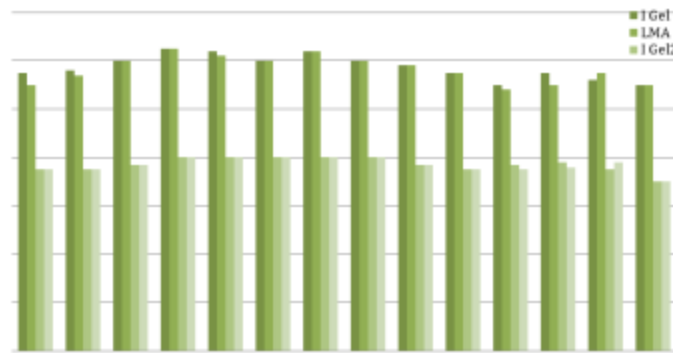


Fig. 2. Changes in heart rate

The main points which are significantly different in both group patients are duration to insert device, efforts while insertion and no. of attempts of insertion. I-gel is superior than LMA as advantages of i-gel is more and given as ease of insertion, more stability, less compression of tissues and economical as well. Table 3 described this comparison.

Table 3. Comparison of LMA and I-gel

Parameters of Insertion of device		Group i-gel N=60 (%)	Group LMA N=60 (%)	P value
Quality of Insertion	Easy	51(85%)	42(70%)	0.00
	Difficult	09(15%)	18(30%)	8
Attempt of Insertion	First	54(90%)	38(63.4%)	
	Second	05(8.4%)	12(20%)	0.005
	Third	01(1.6%)	10(16.6%)	
Insertion Time (Seconds) Mean \pm SD		51.9 \pm 6.001	56.98 \pm 9.921	0.004
Manipulation	Gentle pushing	02(3.4%)	12(20%)	
	Chin lift	01(1.6%)	08(13.4%)	
During insertion		03(5%)	05(8.3%)	

Complication during surgery like cough, difficult device removal and tough numbness was greater in LMA. Comparison is shown in Table 4.

Perioperative complications	Group i-gel	Group LMA
	No of Patients (%)	No of patients (%)
Difficulty in Removal	12 (20%)	30 (50%)
Post Extubation Cough	06 (10%)	18 (30%)
Numbness Of Tongue	03 (6%)	09 (15%)
Presence Of Blood On device	06 (10%)	10 (17%)

Table 4. Preoperative Difficulties

DISCUSSION:

Now a days, numerous methods of airways management are in use which are quite beneficial as compared to conventional methods under general anesthesia. In tracheal intubation, laryngopharyngeal lesions might be caused by direct laryngoscopy. Hypertension is also caused by tracheal intubation raised in plasma catecholamine and sympathetic stimulation, intracranial hypertension and ventricular arrhythmias is generated by it. As there are so many disadvantages of tracheal intubation, so maintenance of airways during anesthesia is done by supraglottic airway device in children and adults. Laryngeal mask airway (LMA) was used in 1981 for airway management. In this modern era, another device known as i-gel is also used. Soft gel with cuff is present in i-gel composition.

In the following research, the situation of device of airway was affirmed by boundaries like satisfactory chest developments, $\text{SPO}_2 \geq 95\%$ and square wave capnography. The position of airway device was done easily in 88% patients utilizing I-gel while 64% of the patients utilizing c LMA. The controls needed in position of I gel was in 12% patients while in 36% patients utilizing c LMA. These controls incorporate jaw thrust and jawline lift. A few examinations done before in more seasoned occasions indicated that position of, I gel is a lot simpler when contrasted with LMA. 13-15 In numerous investigations while looking at inclusion of I-gel and LMA, we came to realize that addition of I-gel was far simple when contrasted with c LMA in patients with neck contracture and just as in typical patients. Also, comparative investigation was performed by Chauhan et al and Trivedi et al regarding addition of I-gel and LMA and discovered comparable outcomes i.e. I-gel was anything but difficult to inset when contrasted with c LMA. Besides, Das et al did comparable examination and reached resolution that i-

gel inclusion includes less controls when contrasted with LMA.

CONCLUSION:

It is concluded that both methods of airway management are available for all patients during anesthesia. I-gel is superior than LMA due to many reasons. Airway is damaged less in i-gel as compared to LMA. Thirdly, supraglottic ventilation's ideal position is achieved in I-gel. I-gel also confirmed perilaryngeal anatomy. As a result, i-gel is excellent airway device.

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