Comparison of 2 Different Techniques of LMA Insertion Namely Traditional Standard Technique of Blind Insertion and Use of Laryngoscope for Guided Insertion of LMA for Successful Placement in an Anatomical Position

Naveen Gowda R.S.[1], Suresh C.[2], Chandrashekar E.[3]

[1, 2] Department of Anaesthesia, EAST Point Medical College Hospital & Fortis Hospital, Bangalore, Karnataka, India. [3]Department of Anaesthesia, E.S.I. Medical College & Hospital, Bangalore, Karnataka, India.

ABSTRACT

BACKGROUND

Determining the optimum insertion technique is very critical because unsuccessful prolonged insertion time and multiple attempts are associated with adverse respiratory and traumatic injuries. The present study was undertaken to compare two different LMA insertion techniques, namely conventional 'Standard' technique and the use of laryngoscope for guided insertion in terms of ease of insertion for successful placement in an ideal anatomical position. We also studied the complications such as pharyngeal trauma, sore throat, and any haemodynamic alterations.

METHODS

Fifty patients were selected from either sex form 15 - 50 years age group, ASA I and II and posted for elective surgery for which general anaesthesia was provided. They were divided into two groups, randomly (n = 25 each). For group A, the airway was secured with Classic LMA of appropriate size with the blind standard technique and for group B, laryngoscopy was used for guided under vision insertion. These two groups were compared in terms of a primary end point i) ease of insertion for successful placement in an ideal anatomical position, based on number of attempts, time required, change of technique, and volume of air required for tight seal, secondary end points ii) pharyngeal trauma, sore throat after its removal and any changes in hemodynamic parameters at 0, 5, 10, 15 minutes of LMA insertion. For statistical significance the differences are compared among the groups.

RESULTS

Both groups were comparable in terms of demographic profile (age and sex) and the ease of insertion was substantially improved without any difficulty in successful insertion in Group B patients (0 % vs. 16 %) and 20 % of Group A patients wanted more than one effective insertion attempt and 3 patients needed laryngoscopy for effective insertion after the insertion. Statistically lesser time was required for successful LMA insertion in Group B patients with use of laryngoscope and also required lesser volume of air to inflate the LMA cuff for a tight seal in an ideal position.

CONCLUSIONS

Laryngoscopic guided LMA insertion technique offers better final positioning of the classic LMA with a high first attempt success rate, which is highly desired by anaesthesiologists.

KEYWORDS

LMA Insertion Techniques, Laryngoscopy, Endotracheal Intubation

Corresponding Author:
Dr. Suresh C.,
H. No. 110, Sai Charitha Green Oaks,
Horamavvu Main Road,
Horamavvu, Bangalore - 560043,
Karnataka, India.
E-mail: csuresh095@gmail.com

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BACKGROUND

LMA was designed by Dr. Archie. I.J. Brain[1] as a search for airways that was more practical than face masks and less invasive than tracheal tubes. It was introduced in clinical practice at the Whitechapel London Hospital in 1983 and is a supraglottic device and has become very popular for anaesthesia where endotracheal intubation is not necessary for general anaesthesia and is blindly introduced into the oropharynx. LMA also provides a simple and effective solution to many difficult intubation problems.[2] In Group B patients, as regards pharyngeal trauma (blood stain on LMA upon removal) and immediate postoperative sore throat was slightly lower, but not statistically important. Patients in both groups had a positive pressure response (sympathetic induced) with no increases in diastolic blood pressure in terms of heart rate increase and systolic blood pressure, these improvements were both clinically and statistically not important.

METHODS

After receiving permission from the Ethical Committee of the institute, the research was carried out on two groups of 25 patients each at the Department of Anaesthesia, Wockhardt Hospitals Ltd., Bangalore. Group A and Group B with grade ASA I and II, having natural airway, admitted for different surgical procedures in the age group of 18 to 50 years. In Group A, the LMA will be inserted by standard technique, and laryngoscope directed by Group B. Insertion of LMA requires airway reflexes to be bounded by general or topical anaesthesia with or without muscle relaxant. Baseline parameters including heart rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure and peripheral saturation of oxygen are noted and monitored upon arrival at the operating theatre. IV fluid is administered with an intravenous cannula (IV). Patients are pre-oxygenated for 3 minutes with 100 percent oxygen. The administration of fentanyl IV 2 mg / Kg body weight, propofol 2 mg / Kg body weight, comfortable with rocuronium 0.8 mg / Kg body weight will cause general anaesthesia. With one of the two methods will be applied to LMA. And CO_2 is to be tracked. With sevoflurane / isoflurane, anaesthesia will be preserved with 40 percent oxygen in nitrous oxide. The tidal volume (VT) and ventilation frequency will be modified and the mechanical ventilator would continue intermittent positive pressure ventilation (IPPV) to maintain end tidal carbon dioxide in the range of 35 - 45 mm Hg.

Inclusion Criteria

American Society of Anesthesiologists Class I and Class II posted for surgery, age group of 18 - 50 years, elective surgeries and normal airway.

Exclusion Criteria

American Society of Anesthesiologists Class III and above, age group less than 18 years and more than 50 years, diabetes mellitus, hypertension, ischaemic heart diseases, valvular heart disease, GI surgeries and laparoscopic surgeries. Procedures involving lithotomy position.

RESULTS

A comparative clinical assessment research involving 50 patients randomly divided into two groups, with 25 patients in Group A (Standard Insertion Technique for LMA) and 25 patients in Group B (Laryngoscope Guided Insertion) are undertaken to study the effect based on the airway laryngeal mask.

Age in Years	Group A		Group B	
	No.	%	No.	%
15 - 20	3	12.0	8	32.0
21 - 30	14	56.0	6	24.0
31 - 40	5	20.0	7	28.0
41 - 50	3	12.0	4	16.0
Total	**25**	**100.0**	**25**	**100.0**
Mean ± SD	29.12 ± 8.54		29.68 ± 11.19	

Table 1. Age Distribution of the Patients Studied

The minimum age of the patient was 15 years and the maximum age of the patient was 50 years in the study groups. Both groups A and group B were statistically comparable with regard to the age group and the' P' value derived was not significant.

Both the study groups A and B were comparable with each other and the p-value derived was non-significant. Group A had 23 males and 2 females while group B had 22 males and 3 females.

Gender	Group A		Group B	
	No	%	No	%
Male	23	92.0	22	88.0
Female	2	8.0	3	12.0
Total	**25**	**100.0**	**25**	**100.0**

Table 2. Gender Distribution of the Patients Studied

Ease of Insertion	Group A		Group B	
	No.	%	No.	%
Easy	20	80.0	25	100.0
Difficult	5	20.0	0	0.0
Total	25	100.0	25	100.0
Inference	Incidence of difficult intubations was more in Group A (20.0 % vs 0 % in Group B) with p = 0.050*			

Table 3. Ease of Insertion

Number of Attempts	Group A		Group B	
	No	%	No	%
1	20	80.0	25	100.0
2	2	8.0	0	0.0
3	3	12.0	0	0.0
Total	**25**	**100.0**	**25**	**100.0**
Inference	Number of attempts are significantly Less in group Fisher Exact test)			

Table 4. Number of Attempts

Group A patients had more difficulty in insertion of LMA (20 % vs. 0 %) into an ideal anatomical position based on the ease of insertion criteria used in the study. In Group B patients the successful insertion of LMA was easier with the use of laryngoscopy. Incidence of difficult insertion was more in Group A (20.0 % vs. 0 % in Group B) with a statistical difference (p = 0.111).

Only 20 patients (80 %) of patients in Group A had a successful insertion of LMA in the first attempt when compared to 100 % success with the use of laryngoscope in Group B patients. 3 patients (12 %) in Group A had a successful LMA insertion with 2 attempts of standard technique and remaining 2 patients (8 %) required 3 attempts of standard technique for successful LMA insertion.

Change of Technique	Group A		Group B	
	No.	%	No.	%
Yes	3	12.0	0	0.0
No	22	88.0	25	100.0
Total	25	100.0	25	100.0
Inference	Incidence of change of technique is observed to be 12.0 in Group A as against 0 % in Group B with p = 0.234			

Table 5. Change of Technique

After failure to obtain an ideal anatomical position with the third attempt of standard techniques, laryngoscope was used for a successful LMA insertion in 3 patients (12 %) in Group A. These patients were not included in Group B as laryngoscope was used as an alternative technique only after failure of 3 attempts of the standard technique.

DISCUSSION

Laryngeal Mask Airway is a supraglottic system and has become very common in providing general anaesthesia for anaesthesia that does not require endotracheal intubation. Artificial airway devices should be installed to enable an optimal or almost ideal anatomical configuration of the airway laryngeal mask to minimize the risk of untoward airway incidents and to optimize their intended function.[3] In addition to the standard LMA insertion process, several other alternative insertion techniques have been identified in clinical practice to improve the success rate of ideal placement, it is very important to evaluate the optimal insertion technique as unsuccessful prolonged insertion period and multiple attempts are linked to adverse respiratory events and trauma.[4] There appeared to be several theoretical advantages from the most ideal placement and subsequently a better seal of the glottis opening with the LMA that peaked our interest during this research study, including 1) decreased room contamination with nitrous oxide, particularly to the surgeon and the assistant; 2) improved airflow dynamics compared to traditional facial or nasal mask techniques usually used in the oral surgery setting of the office; and 3) less leakage when positive pressure ventilation is required.[5,6]

This research aims to compare the frequency of the laryngeal mask airway's ideal anatomic placement using the classical blind insertion method with one where the use of a laryngoscope assisted the placement.

Classical Technique[7]

The ease of insertion in our study was assessed as the number of successful insertion attempts, the time for effective insertion and any changes in technique needed for the ideal anatomical position and with the use of laryngoscope for insertion into LMA, the ease of insertion was better than the classical blind technique, but in a study by Koay et al[8] different criteria has been described for assessing ease of insertion. In a similar study by Kini et al.[9] the ease of insertion and effective final position of classic LMA were compared with standard technique and laryngoscope aided research in 60 ASA I & II, with no difference in ease of insertion of LMA between classes, but the final position of LMA was significantly better with the use of laryngoscopy, without any difference in pharyngeal trauma. The overall success rate identified as successful LMA insertion was 88 percent in Group A and 100 percent in Group B and 3 patients (12 %) in Group A required technique change for successful insertion within three attempts.

An attempt is characterized as one passage of LMA into the oropharynx only and the success rate of the ideal LMA placement was 80 % in Group A and 100 % in Group B at the first attempt; In his research, T Elwood[10] defined that, with the blind technique, airway obstruction is encountered despite repeated attempts at insertion in 2 - 10 percent of cases, alternative techniques are useful in these circumstances to help insert LMA and use laryngoscopy to open pharynx and elevate epiglottis to provide a clear path for or direct insertion of LMA and they are also considered in their study that when the laryngeal mask is inserted for either bronchoscopy or tracheal intubation, the route beyond the LMA lumen should not be obstructed and the use of the laryngoscope as mentioned is a significant alternative technique when the blind insertion technique fails or as a primary technique when the LMA insertion precedes passage of a bronchoscope or endotracheal tube through its lumen.

CONCLUSIONS

Laryngoscopic guided LMA insertion technique offers better final positioning of the classic LMA with a high first attempt success rate, which is highly desired by anesthesiologists to secure an airway.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.
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