

## A Comparison Between a Two Person Insertion Technique of Laryngeal Mask Airway and the Classic One Person Technique

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### Abstract

**Background:** Various studies are seeking to find new methods to improve techniques of laryngeal mask airway (LMA) insertion and reduce possible complications. In this study, we embarked on a clinical study to investigate the advantages of a new insertion method of laryngeal mask and to compare it with the classic method. **Materials and Methods:** Two hundred patients aged 20-60 years old were randomly divided into two groups allocated to receive either the new technique of insertion of LMA (two-person method) or the classic method (one-person method). In the two person method, jaw thrust and mouth opening is done by a technician and then anesthesiologist inserts the LMA. Oxygen saturation, time to insert laryngeal mask, end-tidal carbon dioxide pressure, and the ease of insertion in both groups were measured. The collected data were analyzed by using ANOVA test. P-value < 0.05 was considered as statistically significant. **Results:** The measured end-tidal pressure of carbon dioxide (ETCO<sub>2</sub>) and saturation of O<sub>2</sub> were 31.68 mmHg and 98.87 % in the classic method and 30.47 mmHg and 99.42 % in the two-person method, respectively. These differences were statistically significant for both values. However, the discrepancy of insertion time and ease of insertion between the two groups were not statistically considerable. **Conclusion:** The new technique introduced in this study is associated with higher rate of success, as evidenced by enhancement of saturation of O<sub>2</sub> and reduction of ETCO<sub>2</sub>. Therefore, this method could be considered as a safe and effective method in order to establish a secure airway in anesthetized patients in future studies. [GMJ. 2013;2(4):179-82]

**Keywords:** Laryngeal mask airway; Carbon dioxide; Oxygen saturation; Technique

### Introduction

Nowadays, laryngeal masks are used widely in non-emergency conditions and general anesthesia. These masks were first designed by Brain in 1981 and were used around the world since 1991[1-3]. Laryngeal mask was reached in difficult air way algo-

rithm in 1993 and few years later in 2002 became a part of European protocol for difficult air ways [4,5]. During these years a variety of techniques have been suggested for insertion of this device to minimize the failure rate and possible complications.

Laryngeal mask airway (LMA) is made up of a silicon body that is attached to a rubber

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mask and placed in hypo-pharyngeal airway which is in contact with the airway. Classically, laryngeal mask is taken as a pencil in hand while impregnated with lubricant gel and its cuff is completely empty. Its posterior surface is attached to the palate and moved forward with the pointing finger. After reaching the upper esophageal sphincter, the first resistance, the mask is fixed. 76-96% success rate has been reported; however, as mentioned in previous studies, this method also has noticeable complications [6]. Therefore, many studies were seeking to find new methods to improve this technique.

In this study, we embarked on a clinical study to investigate the advantages of a new insertion method and to compare it with the classic one.

### Materials and Methods

Two hundred patients aged 20-60 years old were studied after obtaining ethics committee approval and written informed consent forms. The participants underwent routine general anesthesia for minor elective eye surgery at Khalili and Dastgheib hospitals, Shiraz, Iran, and were randomly divided into two groups allocated to receive either the new technique of insertion of LMA, two-person method, or the classic method (one-person) for airway management. In the classic method, as previously mentioned, one person is involved. In the two person method, jaw thrust and mouth opening is performed by a technician and then anesthesiologist inserts the LMA. Post-intubation sore throat, hoarseness, dysphagia, cough and bleeding (active or bloody secretions) were evaluated on the next day visit. Oxygen saturation, time to insert laryngeal mask, and end-tidal carbon dioxide (ETCO<sub>2</sub>) were measured. The ease of insertion of the laryngeal mask was graded as (1) easy insertion at the first attempt with no resistance; (2) moderate insertion at the first attempt with little resistance; (3) difficult insertion, but successful at the second attempt. Exclusion criteria included morbid obesity, pregnancy, positive history of sore throat, predicted difficult airway, and poor dentition. Before anesthesia induction, standard anesthetic monitoring including an

electrocardiograph, pulse oximeter, Capnograph, and noninvasive blood pressure monitor were prepared.

Patients were pre-oxygenated and anesthesia was induced with 1.5-2.5 mg/kg Propofol, 50-100 µg/kg Fentanyl, and 0.05-0.1 mg/kg Morphine and muscular relaxation was facilitated with 0.3 mg/kg Atracurium intravenously. The anesthesia was maintained by Remifentanyl and propofol. The disposable LMA (Pertex®, Ireland) was inserted when the eyelash reflex was absent and the patient was apneic. The size of LMA was chosen based on the weight of patients. The LMA size number 3 was the choice for patients weighed 30-49 kg and the number 4 was selected for patients weighed 50- 70. After insertion, the LMA was inflated according to the manufacturer's instructions. Optimal LMA position was confirmed by auscultation and CO<sub>2</sub> exchange on capnograph during manually assisted ventilation. In cases of two failed attempts, endotracheal intubation was performed after removal of the device from the mouth and the patient was excluded from the study afterwards. The LMA insertion failure was defined as air leakage despite performing maneuvers such as head elevation, extension and flexion. All LMA insertions were performed by the same staff anesthesiologist who had placed the LMA on at least 20 occasions before the initiation of the study.

The collected data, oxygenation (oxygen saturation) and ventilation (ETCO<sub>2</sub>), were analyzed using independent sample t tests. P value < 0.05 was considered as statistically significant.

### Results

Based on outcome of data analysis, there were no significant difference between the two groups regarding the age and gender. ETCO<sub>2</sub> and O<sub>2</sub> saturation were reported 31.68±3.68 mmHg and 98.87±0.96%, respectively, in the first group, and 30.47±4.2mmHg and 99.42±0.95% in the second group, respectively. The statistical difference between the two groups for both values was significant (p<0.05). The time of LMA insertion for the first group was 25.88±16.92 seconds, and 24.26±17.03 seconds for the second group.

The differences of this data and also the ease of LMA insertion were not considerable between the 2 groups (Table-1). It should be mentioned that the entire attempts ended to LMA insertion and no intubation was performed.

## Discussion

Since the time when laryngeal masks began to be used in pediatric anesthesia, various methods were suggested in order to enhance its efficacy as well as to reduce its complications. The first suggested method, the classic method, was about 76-96% efficient [6]. Brimacombe *et al.* in a study on 1500 cases, reported that the classic method could be 95% efficient in the first try [7]. Another technique is the reverse one (with rotation about 180°). In this method, the concave part of mask is placed toward the palate and when it is reached to the oropharynx, it should be rotated 180 counter-clockwise and then be directed toward its final location [8,9]. Sue *et al* concluded that this method is more efficient than the classic one in pediatrics [8]. Furthermore, LMA with Fully or partially inflated cuff is also suggested to be another method for anesthesia in children [10]. Wake-ling *et al.* reached to the point that using laryngeal masks with fully inflated cuffs, by an expert ,has no difference in efficacy with

empty cuffs; however, fully inflated cuffs can reduce mucosal damage as well as sorethroat [11]. Moreover, another study by Navaratnam *et al.* declared that using laryngeal masks with partially inflated cuffs in jaw trust and head tilt position is more efficient than any other method [12]. In addition, mask insertion under laryngoscope guide is also considered as another technique [1]. In a study conducted by Koay and Yoong, it was concluded that this method has no priority to the classic one in normal conditions; however, for complicated conditions such as macroglossia, increased platylate arch, tonsillar hypertrophy, and increased pharyngeal tone, this method is more preferred [1]. Besides these, other suggested methods can also be mentioned like anterior traction of the tongue [13], superior laryngeal nerve block [14], and inducing anesthesia in prone position [15].

In this study, a new method is suggested which should be performed by two persons. First of all, the technician performs mouth opening and jaw trust then anesthesiologist inserts the laryngeal mask while standing in the right side of the patient. In this method, the amount of CO<sub>2</sub> at the end of expiration was lower than the classic one; vice versa, O<sub>2</sub> saturation is higher. Yet, efficiency and period of time needed for mask insertion did not differ statistically. However, it can be pointed out that saturation of O<sub>2</sub> and ET-CO<sub>2</sub> are two considerable markers for predicting the success rate of efficient airway management in anesthetic patients since these two factors can be so effective in reducing the complications of anesthesia during or after the operation especially in children and elderly. Yet more studies are needed to confirm the effectiveness of this method and to compare it with the others and to determine the complications of it. In this study, no complication was seen with the LMA insertion. Moreover, performing a blinded study was not possible which can be mentioned as a limitation of this study. Conclusion: The new technique introduced in this study is associated with high rate of success, as evidenced by enhancement of saturation of O<sub>2</sub> and reduction of ET-CO<sub>2</sub>.

Therefore, this method could be considered as a safe and effective method in order to estab-

**Table 1.** A Comparison between a new technique of laryngeal mask airway and the classic technique; Group 1 which received the classic technique (one-person LMA insertion), and group 2 which received the new technique (two-person LMA insertion). Data are expressed as Mean± Standard deviation (SD)

Value	Group	Mean± SD	P value
ETCO <sub>2</sub>	Group 1	31.68±3.68	0.03
	Group 2	30.47±4.21	
O <sub>2</sub> saturation	Group 1	0.96±98.87	0.02
	Group 2	99.42±0.95	
Time of insertion	Group 1	24.26±17.03	0.5
	Group 2	16.92±25.88	
Ease of insertion	Group 1	1.01	0.15
	Group 2	1	

lish a secure airway in anesthetized patients in future studies.

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### Conflicts of interest

None declared

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