



## Anesthesiology

## A PROSPECTIVE RANDOMIZED STUDY TO COMPARE THE EFFECTIVENESS OF AMBU LARYNGEAL MASK AIRWAY WITH CLASSIC LARYNGEAL MASK AIRWAY IN DIAGNOSTIC HYSTEROLAPAROSCOPIC PROCEDURES.

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**ABSTRACT**

**Background of the study:** Supraglottic airway devices are being commonly used in day care surgical procedures.

**Aims and objective:** The Aim of the study is to compare the effectiveness of Classic Laryngeal Mask Airway with AMBU Laryngeal Mask Airway in respect to the following parameters like ease of insertion of airway device, number of attempts for insertion of airway device, time taken for insertion of airway device, hemodynamic response to insertion, blood staining of devices and Incidence of complications.

**Materials and methods:** Sixty female patients of ASA I and II planned for diagnostic hysterolaparoscopic procedures were enrolled in our study.

**Results:** The mean time taken for insertion in AMBU LMA is 15.2 seconds and the mean time taken for the insertion in LMA Classic is 24.77 seconds. Student's t test reveals p value of <0.001 which is statistically significant.

**Conclusion:** From our study we concluded that AMBU LMA was superior to classic LMA in ease of insertion with lesser complications

**KEYWORDS :** Classic LMA, AMBU LMA, Supraglottic airway devices

**INTRODUCTION:**

Supraglottic airway devices are devices that ventilate patients by delivering anaesthetic gases and oxygen above the level of vocal cords thereby avoiding the disadvantages of endotracheal intubation. Supraglottic airway devices have the advantages of avoiding laryngoscopy, better tolerance by the patients, lesser hemodynamic perturbations, lesser invasiveness of the respiratory tract, easier placement of the device, airway free from manipulation, lesser complications like sore throat and easier, quicker control of airway even by inexperienced personnel. Laryngeal mask airway is a type of Supraglottic airway device, invented and designed by Dr. Archie I J Brain in London in 1981. Since then it had been used in over 300 million patients worldwide<sup>1,2</sup>

The LMA-Classic was introduced into clinical practice since 1988. LMA Classic is an autoclavable laryngeal mask airway which can be reused. It consists of an airway tube which is connected to an inflatable mask with a silicone rim. The LMA Classic is available in sizes 1 to 6, is designed to fit most airways, from neonates through large adults; it is reusable up to 40 times with steam autoclaving. The AMBU LMA is a single use disposable Supraglottic airway device manufactured from polyvinyl chloride. It consists of three main elements which include an airway tube, a mount member and a cuff. The device has a bent forming an angle of 90° which makes it easier to insert as it conforms the human airway anatomy. The cuff is thin and fits well with the hypopharynx. Positioning the cuff properly, places the cuff over the upper oesophageal sphincter and at the base of the tongue rests the proximal end of the cuff. The AMBU LMA does not have aperture bars, meaning the bowl is open and it faces the glottis<sup>3,4</sup> With this background this study was conceptualized to compare the performance of LMA-Classic and LMA-AMBU in minor Gynaecological surgeries.

**MATERIALS AND METHODS:**

It was a prospective, randomized, single-blinded, case-controlled study conducted in the Department of Anaesthesiology. Sixty adult patients satisfying the inclusion criteria were enrolled in the study.

**Inclusion criteria:**

Age: 18 yrs and above  
Weight : BMI < 30kg/m<sup>2</sup>  
ASA : I & II  
Elective Surgery  
Mallampatti scores : I & II  
Patients given valid informed consent

**Exclusion criteria:**

Not satisfying inclusion criteria  
Patients posted for emergency surgery  
Patients with difficult airway  
Lack of written informed consent  
Pregnant female  
History suggestive of Gastro oesophageal reflux disease/ Hiatal hernia

Poor lung compliance such as pulmonary fibrosis

**Conduction of the study:**

After obtaining institutional ethical committee clearance, all patients scheduled for elective minor gynaecological surgeries were screened for any comorbid illness and difficult airway. Age, height and weight were assessed. 60 patients satisfying the inclusion criteria were enrolled in the study. A written informed consent was obtained and the patients were randomly allocated into two groups, LMA-C and LMA-A, with 30 each by using closed envelop method. The size of the airway was chosen in accordance to the manufacturers recommendations.

All patients were premedicated with Inj.glycopyrolate 0.2mg iv in the pre anaesthesia room. The patients were shifted inside the operating room and placed in supine position. Non invasive blood pressure monitor, Pulse oximetry and ECG monitor were connected. Baseline Heart rate, Blood pressure and SpO<sub>2</sub> were recorded.

All patients were preoxygenated with 100% oxygen at a flow rate of 6L/min for 3 minutes by using appropriate anatomical face mask. Patient was induced with Inj.Fentanyl 2µ/kg and Inj. Propofol 2mg/kg. Patient was ventilated with nitrous oxygen mixture 4L:4L with sevoflurane 4% for 1 min. In LMA-C group, the appropriate sized LMA-Classic was inserted in sniffing position as per manufacturers recommended technique and is taped in position. The cuff was inflated with air. The air inflated was enough to provide a seal which can permit ventilation without any leaks. The end tidal carbon dioxide trace was noted and the initial square wave waveform was taken as an indicator of effective ventilation. Else, another insertion attempt was tried after removing the device, with a maximum of 3 attempts allowed. The ease of insertion, no of attempts taken for successful placement and the time taken for insertion were recorded in both the groups.

In LMA-A group, the above procedure was performed similarly. In both groups, anaesthesia was maintained with 2% sevoflurane and N<sub>2</sub>O: O<sub>2</sub> at 2:1 ratio. No muscle relaxant was used. The Heart rate and Blood pressure were recorded 1 min after insertion, after 2 minutes and 5 minutes post insertion. At the end of the surgery, after thorough oral suctioning, the airway device was removed upon return of spontaneous breathing and eye opening of the patient. After removing the airway, it was inspected for any blood on the device which is an indication of airway trauma. The following complications were recorded – cough, stridor, laryngospasm and hypoxia. Patients were evaluated for the presence of sore throat before leaving the operating room and 2 hrs post operatively in the recovery room.

**RESULTS:**

A total of 60 female patients were enrolled in our study. Parametric data were compared using unpaired t-test. Data were presented as mean ± standard deviation with p value of less than 0.05 as statistically significant. There were no differences in demographic characteristics of patients between the two groups. The number of attempts, ease of

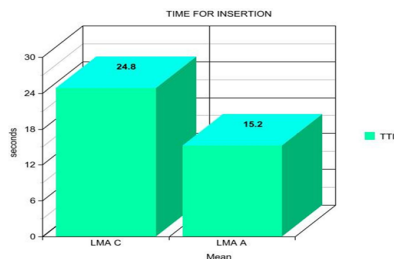
insertion of SGDs were comparable. Insertion time was shorter for AMBU LMA as compared to Classic LMA.

**Table 1: Demographics and other characteristics:**

Characteristics	LMA C (n=30)	LMA A (n=30)	P Value
Age (in years)	34.6	35.4	0.796 (Not significant)
BMI	23.30	23.03	0.652(Not significant)
ASA PS I	24	24	1.000
ASA PS II	6	6	(Not significant)
MMC I	23	23	1.000
MMC II	7	7	(Not significant)

**Table 2: Ease of insertion of airway device:**

Group	Number of patients	Easy		Difficult	
		No	%	No	%
LMA C	30	19	63	11	37
LMA A	30	27	90	3	10
p value ( <i>significant</i> )		0.0126		0.0067	



## DISCUSSION:

AMBU LMA is a type of supraglottic airway device which is a disposable device, better conforming to the human anatomical airway. This study is to compare the clinical performance of LMA Classic with the AMBU LMA. Insertion of AMBU LMA was easy in vast majority of population. In our study AMBU LMA is inserted with ease in 90% of patients and Classic LMA was inserted with ease in 63% of patients. This is in concurrence with the study conducted by Sudhir et.al<sup>2</sup> They compared AMBU LMA with Classic LMA as a cross over study and found that AMBU LMA had better ease of insertion compared to Classic LMA. Suzanna et.al conducted a study and found that AMBU LMA was easier and quicker to insert and they found that AMBU LMA scored 100% and Classic LMA scored only 93% in term of ease of insertion. AMBU LMA was successfully inserted in 100% patients with the first attempt success rate of 93.3%. Classic LMA was successfully inserted in 100% with first attempt success rate of 83.3%. The first attempt success rate was superior for AMBU LMA compared to the Classic LMA<sup>6</sup>

The study conducted by Hagberg et.al reported 87% and 83% first attempt success rate for Classic LMA and AMBU LMA respectively<sup>7</sup> The study conducted by Daryl Lindsay Williams et.al reported 90% and 94% first attempt success rate with Classic LMA and AMBU LMA respectively. The overall success rate in many previous studies is 100%, and is achieved in 2 attempts<sup>8</sup> Securing an effective airway was rapid with AMBU LMA compared with Classic LMA. The time taken for securing the airway with AMBU LMA was 15.2 sec which was shorter than 24.77 sec taken for the Classic LMA group. This was supported by a study done by Cook et.al<sup>9</sup> The mean insertion time was found to be 40 sec for the Classic LMA group and 35 sec for the AMBU LMA group (p = 0.008).

Keller et al and other studies conclude that AMBU LMA took shorter time for insertion compared to Classic LMA. The shorter insertion time can be extremely beneficial in difficult airway or in emergency situations<sup>10</sup> The heart rate, SBP, DBP and MAP after insertion were maintained better with AMBU LMA than the Classic LMA. This is supported by the study conducted by Jakobsson et.al<sup>11</sup> The study concludes stating that haemodynamic instability following insertion of either of the airway devices were similar. Many other studies came to the conclusion that haemodynamic responses were similar among AMBU LMA and Classic LMA.

Incidence of blood staining found on the device due to airway trauma is comparable among both the devices. evaluated the efficacy and found

that blood staining was found in 22 % and 14 % in Classic LMA and AMBU LMA respectively which were comparable<sup>12,13</sup> Incidence of sore throat were comparable among Classic LMA and AMBU LMA. Francksen et.al reported the incidence of sore throat of 10% in AMBU LMA group and 13 % in Classic LMA group which were comparable<sup>14</sup> AMBU LMA has the advantage of being a single use device. There is an increased tendency towards single use devices due to awareness that protein and bacteria persist on anaesthetic and surgical instruments following decontamination and sterilization. Being a single use device it can reduce or even eliminate this problem. Our study has certain limitations. First, we studied a female population with normal airways undergoing elective minor gynaecological surgeries. The data collected cannot be extrapolated to the use of LMA classic and LMA AMBU in males. Second, blinding was not practically possible, which may be a possible source of bias. Finally, being a single use device the cost effectiveness was not addressed.

## CONCLUSION:

AMBU LMA is an equally effective airway device to Classic LMA in gynaecological surgeries. It has potential advantages like easier and quicker to insert, better success rate at first attempt, lesser haemodynamic response and less airway trauma.

## Conflict of interest: Nil

## Acknowledgement: None declared:

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