

SUCCESS RATE OF INTUBATING LARYNGEAL MASK AIRWAY FOR BLIND ORAL INTUBATION IN PATIENTS UNDERGOING SURGERY UNDER GENERAL ANESTHESIALokesh Kumar K. S¹, Rajalakshmi J², Santosh Kumar³**HOW TO CITE THIS ARTICLE:**

Lokesh Kumar K S, Rajalakshmi J, Santosh Kumar. "Success Rate of Intubating Laryngeal Mask Airway for Blind Oral Intubation in patients undergoing Surgery under general Anesthesia". Journal of Evolution of Medical and Dental Sciences 2014; Vol. 3, Issue 63, November 20; Page: 13923-13930, DOI: 10.14260/jemds/2014/3861

ABSTRACT: BACKGROUND: Airway management plays a key role in day to day anesthesia practice. But unanticipated difficult airway and unnecessary pressor response to laryngoscopy and intubation remains a challenge to the anesthesiologist. A continuous effort has been made to develop new methods and tools to facilitate endotracheal intubation and minimize pressor response. One such device was Laryngeal Mask Airway (LMA). However, the use of LMA was associated with problems like gastric insufflation, pulmonary aspiration, inadequate ventilation and the inability to generate high inflation pressures in bronchospastic patients. Hence ILMA was introduced as an alternative. **METHODS:** In this prospective study, the feasibility of Intubating Laryngeal Mask Airway (ILMA) insertion and blind endotracheal intubation through ILMA was done in 100 patients undergoing various elective surgeries under general anesthesia. Only ASA Grade I and II patients with normal airway (Mallampati Class I and II) were selected. After administering conventional general anaesthesia, ILMA was inserted as per the standard technique. Blind endotracheal intubation was done through ILMA. Time required for insertion of ILMA, number of attempts required, time duration to achieve intubation and number of attempts for blind endotracheal intubation were recorded. **RESULTS:** Our study showed that ILMA was inserted successfully in all patients, 91% required one attempt and 9% required 2 attempts. The mean time duration for successful ILMA placement was 33.47 secs. Blind endotracheal intubation through ILMA was possible in 97% of patients, 75% required 1 attempt, 18% required 2 attempts and 4% required 3 attempts. The mean time duration for blind endotracheal tube insertion was 21.74+6.98 secs. **CONCLUSION:** Thus from our study it can be concluded that ILMA can be used as a blind intubation guide with a higher success rate. **KEYWORDS:** Intubating Laryngeal Mask Airway, Blind endotracheal tube insertion, Success rate.

INTRODUCTION: The conventional method of securing the airway with endotracheal tube involves introduction of laryngoscope into the oral cavity with patient in the sniffing position. This process involves distortion¹ of normal anatomy and is also associated with extensive sympathetic stimulation leading to tachycardia, hypertension and arrhythmias.²

To address the fact of these preventable tragic events, a continuous effort has been made to develop new methods and tools to facilitate endotracheal intubation. One such device was Laryngeal Mask Airway³ (LMA) introduced by Dr. Brain in 1983. However, the use of LMA was associated with certain problems like gastric insufflation, pulmonary aspiration, inadequate ventilation because of suboptimal positioning, and the inability to generate high inflation pressures in bronchospastic patients.⁴ As classic LMA was not ideally suited for securing the airway with endotracheal tube, Dr. Brain brought about certain modifications in classic LMA and introduced an Intubating Laryngeal Mask Airway (ILMA).¹

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ILMA was introduced into clinical practice in 1997 and is extensively used for securing the airway with blind endotracheal intubation through it.⁵ In view of this, the present study was undertaken to find out the feasibility of blind endotracheal intubation through ILMA and find out any problems associated with the use of ILMA.

METHODS: After approval of ethics committee and obtaining informed written consent, 100 patients aged between 18 and 60 years posted for various surgeries under general anaesthesia were selected on the basis of simple random sampling method.

Patients with history of Hypertension, IHD, CVA and endocrinal diseases like diabetes, patients at risk of regurgitation and aspiration, patients with respiratory tract pathology and patients who required a nasal route for intubation were excluded from the study. Only ASA grade I and II patients with normal airway (Mallampati class 1 and 2) and who were weighing between 50-70Kgs were included.

In the operation theatre, all patients were connected to monitors and premedicated with Inj. Ranitidine 50 mg IV, Metoclopramide 10 mg IV, Midazolam 0.02mg/kg IV and Fentanyl 2µg/kg IV. Thiopentone 5 mg/kg IV was used for induction and ease of mask ventilation noted. Vecuronium 0.1mg/kg was used as relaxant and mask ventilation continued. 3 mins after administering vecuronium, ILMA Fastrach Size 4 of Laryngeal Mask Airway Limited (USA), stipulated for use in patients weighing between 50-70 Kgs, was introduced as per the standard technique of insertion described by Brain. Cuff of the mask was then inflated with 30 ml of air. If ventilation was not satisfactory, the 1st step of Chandy's maneuver was done which consists of slightly rotating the device in the sagittal plane using the metal handle until the least resistance to bag ventilation is achieved.

After optimizing ventilation, just before intubation, 2nd step of Chandy's maneuver was used, which consists of using the metal handle to slightly lift the ILMA away from the posterior pharyngeal wall. Well lubricated Latex free silicon endotracheal tube of appropriate size, was now inserted through the ILMA. If the first attempt failed, then the following maneuvers were done sequentially to facilitate endotracheal intubation:

- a) Extension maneuver: pulling back of the metal handle of the ILMA towards the intubator
- b) Up-down maneuver: withdrawal of ILMA with cuff inflated by 5 cm followed by reinsertion.

When the tracheal intubation was successful, the ILMA was removed after the tracheal tube cuff was inflated and stabilised using the tube stabilizer to prevent accidental extubation while the device was being withdrawn after deflating the cuff of ILMA. After intubation anesthesia was maintained with Isoflurane and 60% N₂O in O₂.

Failure to intubate was defined as inability to place the tracheal tube successfully after all 3 maneuvers had been attempted. In such situations, the procedure was abandoned and tracheal intubation was performed using direct laryngoscopy.

Time required for insertion of ILMA, number of attempts required for insertion of ILMA, time required to achieve intubation, number of attempts required for blind endotracheal intubation were recorded.

Complications like trauma, mucosal injury, bleeding, sore throat and hoarseness were studied.

The results were analysed statistically using standard deviation, frequencies, percentages, t-test and ANOVA (Analysis of Variance).

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RESULTS: The demographic characters like age, sex, weight and nature of surgeries were similar in all the subjects.

Number of attempts for ILMA insertion	No. of patients	Percentage
1	91	91
2	9	9
3	0	0
Failed	0	0
Total	100	100

Table 1: Number of attempts for ILMA insertion

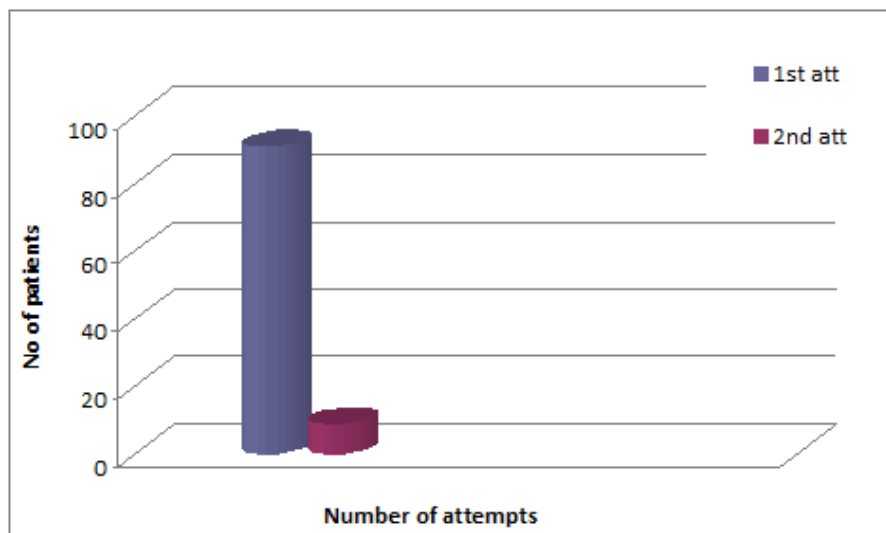


Fig. 1: Number of attempts for ILMA insertion

Table 1 and Fig 1 shows the number of attempts required for ILMA insertion. ILMA was successfully inserted in all 100 patients. In 91% of patients ILMA was successfully inserted in the first attempt and 9% required 2 attempts. There was no failure for ILMA insertion.

No. of attempts	Mean time (Secs)	Range (Secs)
1	32.34+5.19	23 – 48
2	44.88+4.72	36 – 50
3	Nil	
Minimum time	23	
Maximum time	50	
Overall Mean time	33.47+6.27	23 – 50

Table 2: Time taken for ILMA insertion

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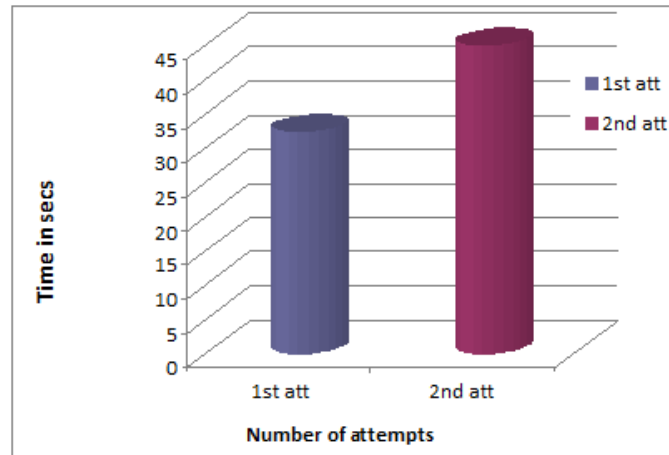


Fig. 2: Time taken for ILMA insertion

Table 2 and Fig. 2 shows the mean time required for ILMA insertion. In cases wherein ILMA was inserted in one attempt the minimum time was 23 secs, maximum time was 48 secs and mean time was 32.34+5.19secs. In cases wherein ILMA was inserted in 2 attempts, minimum time was 36 secs, maximum time was 50 secs and mean time was 44.88+4.72secs. Overall Mean time in our study was 33.47+6.27 secs with a range from 23 seconds to 50 seconds.

No. of Attempts	No. of patients	Percentage
1	75	75
2	18	18
3	4	4
Failed	3	3
Total	100	

Table 3: Number of attempts for endotracheal tube insertion

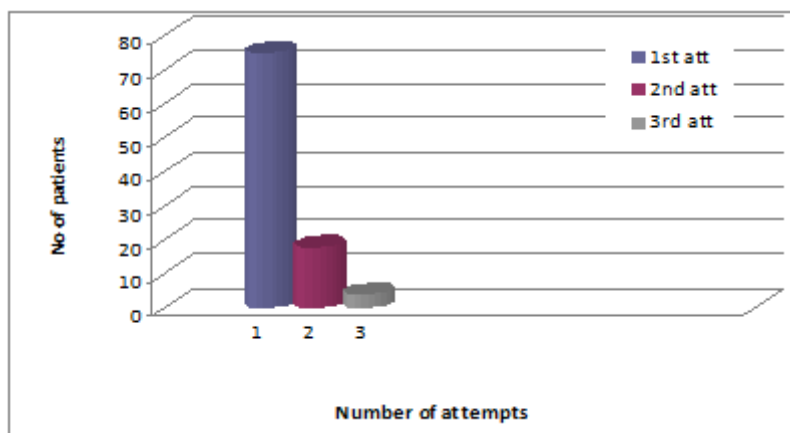


Fig. 3: Number of attempts for endotracheal tube insertion

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Table 3 and Fig. 3 shows the number of attempts required for ETT insertion. In 75 patients we could intubate the trachea in the 1st attempt itself using the 2nd step of Chandy's maneuver. Of the remaining 25 patients, 18 patients required extension maneuver in addition to 2nd step of Chandy's maneuver. In 4 patients, in addition to 2nd step of Chandy's maneuver and extension maneuver, we had to use up-down maneuver to achieve intubation. In 3 patients, we could not intubate the trachea inspite of attempting all 3 maneuvers and thus we considered them as failure and so a conventional laryngoscopy and intubation was carried out.

No. of attempts	Mean time (Secs)	Range (Secs)
1	18.69+3.02	15 - 29
2	30.27+5.36	18 - 40
3	40.50+5.74	36 - 48
Minimum time	15	
Maximum time	48	
Mean time	21.74+6.98	

Table 4: Time taken for endotracheal tube insertion

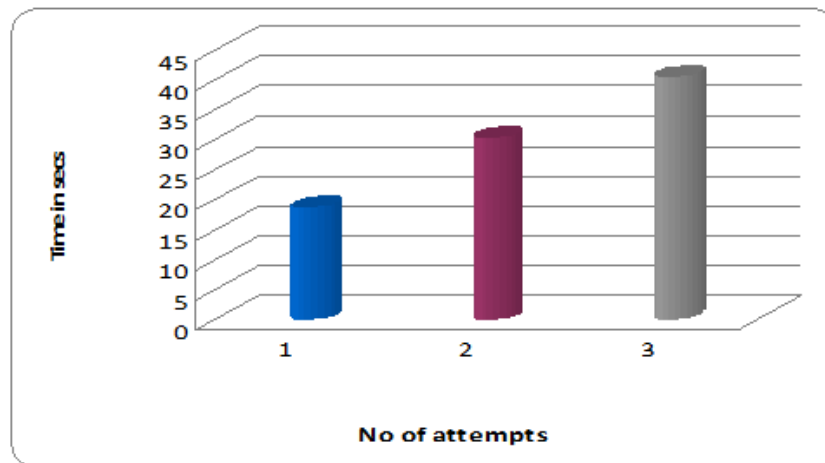


Fig. 4: Time taken for endotracheal tube insertion

Table 4 and Fig 4.shows the time required for insertion of ETT. When trachea was intubated in 1st attempt, the minimum time was 15 secs and maximum time was 29 secs, with a mean of 18.69+3.02secs. When trachea was intubated in 2nd attempt, minimum time was 18 secs and maximum time was 40 secs with a mean of 30.27+5.36 secs. When trachea was intubated in 3rd attempt minimum time was 36 secs and maximum time was 48 secs with a mean of 40.5 secs. Overall the minimum time was 15 secs and maximum time 48 secs. Mean time was 21.74+6.98 secs.

COMPLICATIONS: Mucosal trauma occurred in 8 patients and sorethroat in 10 patients. It was noted that in majority of these cases, where mucosal trauma and sorethroat occurred, more number of attempts were needed for blind endotracheal intubation through ILMA. Hoarseness of voice was not noticed in any of the patients in the present study.

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DISCUSSION: The novel Laryngeal Mask Airway introduced by Dr. Brain in the year 1983 fulfilled to bridge the gap between airway and tracheal tube. However, the use of LMA was associated with some problems like gastric distension and pulmonary aspiration⁴. Hence its modification, ILMA, was introduced, wherein all the desirable properties of classic LMA were retained and in addition it was possible to secure the airway with endotracheal tube thereby preventing the risk of Hypoxia, gastric distension and acid aspiration pneumonitis.

There are many reports of successful use of ILMA for blind endotracheal intubation even in patients with suspected difficult airways. In view of it, the present study was undertaken to evaluate the use of ILMA as a method of securing the airway in patients who undergo general anesthesia for the intended surgical procedure.

In our study, in 91 patients ILMA was inserted in the 1st attempt itself with appropriate ILMA-larynx alignment. In 9 patients this ILMA-larynx alignment was not achieved in the 1st attempt and ILMA was removed and inserted again. Out of these 9 patients who required 2nd attempt for ILMA insertion, 5 patients required additional pushup or pushdown maneuver and other 2 required rightward and remaining 2 required leftward movement of ILMA to obtain optimal ILMA-larynx alignment.

Different authors have noted various time duration for insertion of ILMA. Shetty AN et al,⁶ has noted a mean time duration of 14.07+11.62 secs. Timmerman et al⁷ noted a minimum time of 25 secs, maximum time of 43 secs and mean time duration of 35.6+8 secs for ILMA insertion. In our study, we noted that in cases where ILMA was inserted in 1st attempt the minimum time was 23 secs, maximum time was 48 secs and mean time was 32.34+5.19secs. In cases wherein ILMA was inserted in 2nd attempt, minimum time was 36 secs, maximum time was 50 secs and mean time was 44.88+4.72secs. Overall Mean time in our study was 33.47+6.27 secs with a range from 23 seconds to 50 seconds which is in concurrence with the studies of Timmerman et al.⁷

Overall success rates of ILMA insertion in the studies conducted by Brain et al,⁵ Ferson et al,⁸ Chan et al,⁹ Lu PP et al¹⁰ and Kundra et al¹¹ was 100%. In our study also, we noted an overall success rate of 100% for ILMA insertion and all the patients could easily be ventilated through ILMA.

Time required to achieve endotracheal Intubation: This study noted that as the number of attempts increased the time required to achieve intubation also increased. But the overall mean duration of 21.74+6.98secs of our study is in concurrence with the studies of Shetty AN et al.⁶

Number of attempts for endotracheal tube Insertion:

Authors	1 st attempt success rate	2 nd attempt success rate	3 rd attempt success rate	Overall success rate in 3 attempts
Brain et al ⁵	50%	19%	14%	83%
Shetty AN et al ⁶	58%	27%	11%	96%
Ferson et al ⁸	75.5%	14%	3.5%	93%
Chan et al ⁹	50%	42%	5%	97%
Lu PP et al ¹⁰	80.9%	6.2%	8.4%	95.5%
Kundra et al ¹¹	86%	10%	-	96%

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Langeron et al ¹²	71%	21%	8%	100%
Liu et al ¹³	67.3%	21.2%	7.3%	95.8%
Bharti et al ¹⁴	65%	22.5%	10%	97.5%
Present study	75%	18%	4%	97%

Table 5: Describes the number of attempts for blind endotracheal intubation through ILMA

In our study the 1st attempt success rate was 75% which is similar to the studies of Ferson et al⁸ and the 2nd attempt success rate was 18% which is close to the studies of Brain et al,⁵ Langeron et al¹² and Liu et al.¹³ The 3rd attempt success rate was 4%. This is in concurrence with the studies of Ferson et al⁸ and Chan et al.⁹ The 2nd step of Chandy's maneuver, extension maneuver and Up-down maneuver when used sequentially proved to be very effective for successful endotracheal intubation.

Success rate of endotracheal tube Insertion: In our study we noted an overall success rate of 97% which is in concurrence with the studies of Chan et al,⁹ Brain et al⁵, Shetty AN et al⁶ and Ferson et al.⁸

Failure Rate: In our study we noticed a failure rate of 3% which is in concurrence with the studies of Ferson et al,⁸ Chan et al⁹ and Kundra et al.¹¹ Though the exact reason for failure in our study is not known, possible reasons may be learning curve in acquiring expertise in the use of ILMA⁵, poor ILMA-larynx alignment, inadequate seal⁶ and elongated or downfolded epiglottis¹⁰.

CONCLUSION: In our study we conclude that ILMA can be inserted easily and the success rate is 100%. Additional maneuvers consisting of Step 1 and 2 of Chandy's maneuver, rightward or leftward movement, extension maneuver and up-down maneuver are useful maneuvers for obtaining good ILMA-larynx alignment and endotracheal intubation. Also Blind endotracheal intubation through ILMA has high success rate (97%).

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