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A Comparision of Use of Intubating Laryngeal Mask Airway (ILMA) and Endotracheal Tube (ETT) For Orotracheal Intubation Undergoing Elective Surgical Procedure under General Anaesthesia: A Single Blinded, Prospective, Randomised Study

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Abstract

Background: Conventional method of laryngoscopy and introduction of endotracheal tube (ETT) is gold standard technique but Intubating Laryngeal mask airway (ILMA) may be an alternative device in airway management. Due to few studies regarding the use of these airway devices, we conducted a prospective, randomised study to compare haemodynamic response, insertion characteristics and laryngopharyngeal morbidities in patients undergoing surgery under general anaesthesia.

Methods: One hundred adult patients of age 18-60 years, either sex, ASA physical status I-II, randomly allocated to either ILMA(n=50) or ETT(n=50) group by computer generated random number table. After induction of anaesthesia with propofol, fentanyl and vecuronium, the assigned airway devices were introduced and maintained with sevoflurane, nitrous oxide, and oxygen. The insertion characteristics of devices, haemodynamic changes, and postoperative laryngopharyngeal morbidity were noted.

Results: There was no failed insertion of devices. Effective airway time 33.03s(4.61s) and 31.43s(10.35 s), for ETT and ILMA respectively. There was no statistically significant difference found between two groups in Oropharyngeal leak pressure. mean Heart rate (19.00% in group ETT vs13.93% in group ILMA). Systolic BP increased (13.96% in group ETT vs 10.03% in Group ILMA) and Diastolic BP increased (14.88% in group ETT vs 10.34% in group ILMA) immediately after insertion which was very highly significant($p<0.001$). No statistically significant difference in laryngopharyngeal morbidity was noted.

Conclusion: ILMA proved to be a suitable and safe alternative to ETT for airway management. The insertion characteristics and pharyngolaryngeal morbidity was

comparable in both the groups provides better haemodynamic stability compared to ETT.

Keywords: Endotracheal Tube, Oropharyngeal Leak Pressure, Effective Airway Time, Intubating Laryngeal Mask Airway, Laryngopharyngeal Morbidity.

Introduction

The conventional method of securing the airway with endotracheal tube (ETT) involves introduction of laryngoscope into the oral cavity with patient in the sniffing position which involves distortion of normal anatomy in order to bring the glottis into the line of sight [1] and is also associated with extensive sympathetic stimulation leading to tachycardia, hypertension and arrhythmias,[2] although these alterations are short lived. Because it is not always desirable to distort the anatomy, failed intubation can occur in some cases. Caplan and colleagues noted an alarming 34% of adverse events in anesthetized patients resulting in negative outcome.[3] Of these, 85% led to brain injury or death due to inadequate ventilation, difficulty in securing the airway with an endotracheal tube or undetected Oesophageal intubation. To address the fact that 72% of these tragic events are preventable, a continuous effort has been made to develop new methods and tools to facilitate endotracheal intubation.

Intubating laryngeal mask airway (ILMA) was developed by Dr. Archie Brain in 1997.It is relatively non-invasive, easy it is used for blind endotracheal intubation. [1,4]and hence requires less skill and training in comparison to endotracheal intubation and causes minimal hemodynamic and respiratory disturbances. Ventilation of lungs during intubation attempts is possible using ILMA. It has a lesser risk of airway injury during the perioperative period. [5-7] Injuries to the airway are well-recognized complications of general anaesthesia (GA). Airway injuries are claims in American Society of Anaesthesiologists (ASA) databases that injuries to the larynx represent about 33%, relating to long lasting pain and voice complaints due to nerve apraxia and cartilage trauma.[8] Sore throat had been rated as the eighth most adverse effect in the postoperative period following GA which can contribute to postoperative morbidity and patient dissatisfaction.[9]

Due to paucity of studies on the comparision of ILMA with ETT, this study was undertaken with primary aim to compare hemodynamic changes (heart rate, systolic, diastolic blood pressure and mean arterial pressure) and device insertion characteristics, with secondary aim to compare pharyngolaryngeal morbidity – postoperative complication such as cough, blood on device, sore throat, hoarseness and difficulty in swallowing between the two groups.

Materials and Methods

After approval from Institutional Ethics Committee (Human), PDU Medical College and Hospital, Rajkot [Reg. no. PDU MCR/IEC/19064/2016], we conducted a prospective, randomized, single blinded study after informed consent from 100 adult patients belonging to ASA grade I-II, age group 18-65 years scheduled for elective surgery not lasting for more than 120 mins in supine position under general anaesthesia. Known/predicted difficult airway with Mallampati class 3 and 4, oropharyngeal pathology, cervical spine fracture or instability, increased risk of aspiration, history of cardio-respiratory and other systemic illness, history of allergic reaction, pregnant, BMI > 35kg/m2 (Obesity) were excluded from the study.

Patients were kept nil by mouth (6 hours) after a thorough pre-anaesthetic check-up done the day before the surgery. An intravenous line was secured inside the

OR and patients were applied to a multipara monitor showing ECG, SPO2, NIBP and ETCO2 and baseline pulse rate, blood pressure were recorded. All patients were pre-medicated with Inj. Glycopyrrolate (4 mcg/kg), Inj. Ondansetron (0.08-0.1mg/kg), Inj. Fentanyl (1-2 mcg/kg), Inj. Midazolam 0.5-1.0mg intravenously.

Patients were allocated into two groups using a computer-generated random number and concealed by sealed opaque envelopes. Odd number for control group (ETT) cases and even number for other group (ILMA).

Group 1 (ETT): Intubation with Macintosh Laryngoscope after direct laryngoscopy.

Group 2 (ILMA): Intubation with Intubating LMA.

All patients were preoxygenated with 100% for 3 minutes and anaesthesia induction was done with Inj. Propofol 2-2.5 mg/kg and Inj. Vecuronium Bromide 0.1mg/kg to facilitate intubation. After loss of consciousness, ventilation of lungs was manually assisted and airway was secured with endotracheal intubation with PVC Endotracheal tube or wire reinforced silicon tube through ILMA. The number of attempts to achieve successful tracheal intubation was compared between two groups.

For group 1 (ETT), with the aid of Macintosh Laryngoscope, direct laryngoscopy was done after giving proper neck position and intubation done with ETT of size 7/7.5 for female and 8/8.5 for male patients.

For group 2 (ILMA), when patient was fully relaxed (adequate mandibular relaxation), an appropriate sized ILMA was inserted (cuff deflated) in neutral position of head as per the standard technique by Dr Brain, involving the handle of ILMA held with a dominant hand and tip of mask was pressed against the hard palate and the handle was pressed firmly in the cranio-caudal direction, and device inserted with a rotational movement along the posterior pharyngeal wall. cuff of the mask was inflated with air, up to 20ml, 30ml and 40ml for respective size of 3,4 and 5. Chandy's manoeuvre was done (slightly rotating the device in the sagittal plane using the metal handle until the least resistance to bag ventilation is achieved). Additional manoeuvre like leftward or rightward rotation was done to obtain optimal seal. metal handle lifts the ILMA away from the posterior pharyngeal wall which facilitates smooth passage of endotracheal tube into the trachea. Well lubricated Latex free silicon endotracheal tube Number 7 or 7.5, supplied along with the ILMA inserted through the ILMA. If first attempt failed, another two manoeuvres :1**)** Extension manoeuvre (pulling back of the metal handle of the ILMA towards the intubator), 2) Up-down manoeuvre (withdrawal of ILMA with cuff inflated by 5 cm followed by reinsertion.) When the tracheal intubation was successful, the ILMA was removed after tracheal tube cuff was inflated to prevent accidental extubation.

Successful tracheal intubation was confirmed by chest wall movements, auscultation of breath sounds and capnography tracing during manual ventilation.

The Effective airway time was measured from the picking up the devices to obtaining effective ventilation as confirmed by EtCo2 tracing on the monitor. In the event of complete or partial airway obstruction or a significant airway leak, the ILMA removed and reinsertion attempted.

A maximum of three insertions were allowed before the placement of device was considered as a failure. In case of failure, alternative airway devices were used to secure airway. Both devices were inserted by one of the primary investigators who were well experienced with both devices and insertion techniques.

After device placement, Oropharyngeal leak pressure (OLP) was determined following device insertion and after 30 min. of insertion in supine position by closing the expiratory valve of the circle system at a fixed gas flow of 3 L/min and noting the airway pressure when the equilibrium was reached. To ensure safety, the maximal allowable OLP was fixed at 40 cmH_2o. Cuff pressure were monitored using (PYLANT MONITOR) cuff pressure monitor which available in our institute. A maximum pressure of 40-50 cmH_2O for ILMA tracheal cuff and 20-30 cmH_2O for ETT cuff, was allowed during measurement. Vital signs (heart rate, blood pressure) were recorded at the baseline level after induction, after placing devices at intervals of 1^{st} min,3^{rd} min and 5^{th} min. Volume controlled ventilation was initiated at a tidal volume of 8ml/kg and a respiratory rate adjusted approximately around 12 breaths/min to maintain an EtCO2 concentration of 35-45 mmHg. Maintenance was done by using oxygen, nitrous oxide (40-60% ratio) and sevoflurane.

At the end of surgery, reversal of neuromuscular blockade was done with inj. glycopyrrolate 0.008mg/kg I.V. and inj. neostigmine 0.05mg/kg I.V. Extubation done after extubation criteria were met and the haemodynamic parameters were recorded at 1,3 & 5 minute after extubation. After removal, the airway devices were grossly examined for the presence of blood. In recovery room, when patients were fully conscious, observer assessed the patient by standard oral questionnaire to determine if any complaint of sore throat, difficulty in swallowing and graded as per Table 5. Patients were followed up for 24 hours to assess the pharyngolaryngeal morbidity.

The primary outcome variable of this study was comparision of the haemodynamic parameter changes like Heart Rate (HR), Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP) and Mean Arterial Pressure (MAP) were recorded: before insertion of ETT/ILMA, after tracheal intubation at one, three and five minutes and insertion characteristics. Secondary outcome variables were comparision of pharyngolaryngeal morbidity with respect to oropharyngeal cuff pressure.

Statistical Analysis

Sample size was determined from a previous pilot study to be a 46 in each group, allowing an alpha-error of 0.05 and a beta error of 0.2 (power of 80%) to detect a difference of 30% in the hemodynamic (Mean blood pressure) changes. Considering the possibility of drop outs from the study, we decided to include 50 patients in each group for this study.

The raw data was collected in Microsoft excel sheets and statistical analysis was done by Statistical Package for Social Sciences (SPSS)Version 20.0. Quantitative data were expressed in mean ± standard deviation. Qualitative data expressed in frequency and percentage. P value< 0.05 considered as statistically significant value.

Observations and Results

Hundred patients were enrolled and were randomized in two groups according to the airway device placed (ILMA or ETT). The CONSORT (Consolidated Standards of Reporting Trials) flow Diagram for patient participations is shown in Fig. 1. Both the groups were similar in terms of demographic variable characteristics [figure 2] considering age, gender, weight and Mallampati score.

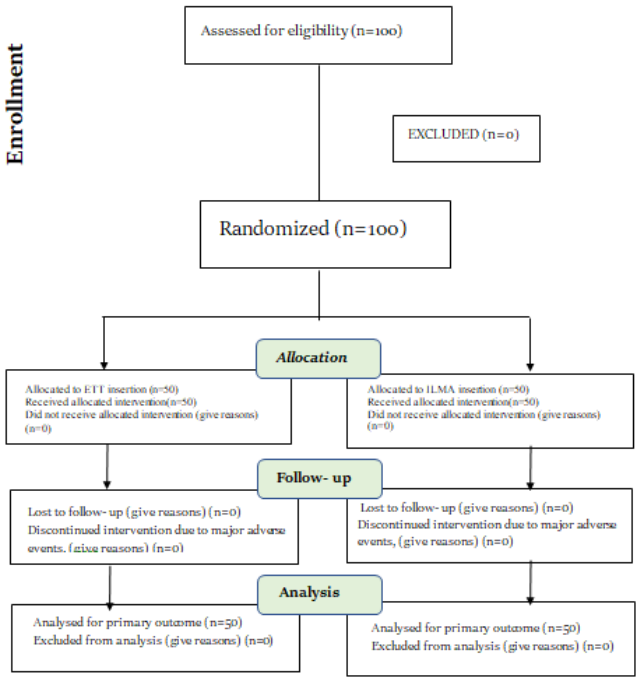

Figure 1: The Consert Flow Diagram For Patient Participations

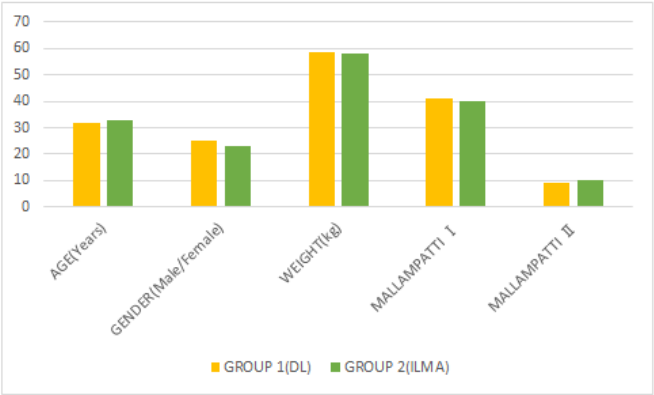

Figure 2: Demographic Characteristic of Patients

Variables		Group 1	Group 2	P Value
Attempts of Insertion (1st/2nd/3rd/FAILED)		47/3/0/0	46/4/0/0	-
Effective Airway Time (Seconds)		33.03(4.61)	31.43(10.35)	0.320
Oropharyngeal Leak Pressure [OLP] (cmH_20)	At insertion	24.68± 4.48	26.40± 3.63	0.632
	At 30 min. after insertion	25.04±2.64	28.46±3.20	0.146

Table 1: Airway Device Insertion Characteristics

There was no statistically significant difference with airway devices insertion characteristics with regard to subjective ease of insertion, no. of attempts taken to successfully place the devices. Effective airway time is lesser in ILMA group was 31.43 s (10.35s) in comparision to 33.03s (4.61 s) in ETT group. OLP was (24.68 cmH_2o) for ETT and (26.40 cmH_20) for ILMA group at insertion, and after 30 min. of device insertion OLP was 25.04 cmH_20 and 28.46 cmH_20 for ETT and ILMA respectively. Hence there was no statistically significant difference in the two groups.

Haemodynamic response between two groups at various time intervals seen as increase in HR and MAP as compared to baseline in both the groups. The heart rate increased post induction and post extubation remained elevated for more than 5 minutes in both the groups, after ETT and ILMA insertion. The Mean increase in heart rate for both the groups was almost similar (Table 2) but significantly high in group 1.

Variable		Base Line	Before Insertion	After Insertion			After Extubation		
				1 Min.	3 Min.	5 Min.	1 Min.	3 Min.	5 Min.
Mean Heart rate (mean± SD)	Group 1	82.6 ± 7.51	84.0 ± 7.37	98.3 ± 10.14	93.7 ± 9.60	89.8 ± 9.17	98.0 ± 10.57	92.0 ± 8.908	87.8 ± 9.51
	Group 2	82.5 ± 9.10	83.7 ± 9.44	94.0 ± 11.70	89.1 ± 10.00	85.8 ± 10.46	98.4 ± 11.18	92.6 ± 9.61	88.0 ± 9.48
P Value		0.9428	0.8321	0.0493	0.0221	0.0427	0.8834	0.7315	0.9163
Mean Arterial bp(mean± SD)	Group 1	90.6 ±6.76	93.1 ±6.54	104.3 ±7.12	99.7±7.11	96.1 ±6.61	101.6 ±9.79	95.1 ±8.06	91.3 ±8.55
	Group 2	89.5 ±5.99	90.6 ± 6.25	98.6 ±8.02	94.2 ±8.15	92.7 ±7.86	101.7 ±9.09	97.4 ±8.21	92.7 ±8.80
P Value		0.3433	0.0552	0.0003	0.0005	0.0188	0.9242	0.1725	0.3965

∗Map- Mean Arterial Blood Pressure.

Table 2: Intergroup Mean Heart Rate & Mean Blood Pressure Changes

Very highly significant increase in the SBP after insertion of device was noted in group ETT when compared to ILMA group. Also, the SBP remained elevated for 1st 5 min in both the groups. The DBP remain elevated for 5 minutes in both the groups after insertion and extubation of devices (Table 3).

Variable		Base Line	Before Insertion	After Insertion			After Extubation		
				1 Min.	3 Min.	5 Min.	1 Min.	3 Min.	5 Min.
Mean systolic bp (mean± SD)	Group 1	120.3 ± 9.99	123.0 ± 9.98	137.1 ± 8.35	131.5 ± 10.15	126.1 ± 8.85	134.4 ± 12.22	125.9 ± 10.47	121.4 ± 10.62
	Group 2	117.6 ± 10.73	119.4 ± 11.69	129.4 ± 12.18	122.8 ± 11.65	120.4 ± 10.63	136.5 ± 12.83	129.6 ± 12.29	123.2 ± 12.50
P Value		0.2060	0.1086	0.0004	0.0001	0.0040	0.3996	0.1065	0.4396
Mean Diastolic bp (mean± SD)	Group 1	76.6 ± 6.37	78.1 ± 6.16	88.0 ± 7.70	83.8 ± 7.45	81.1 ± 7.04	85.2 ± 9.91	79.8± 7.92	76.3 ± 8.35
	Group 2	75.4 ± 5.02	76.1 ± 5.09	83.2 ± 7.93	79.9 ± 8.77	78.8 ± 8.96	84.4 ± 9.37	81.2 ± 7.92	77.5 ± 8.26
P Value		0.2822	0.0798	0.0003	0.0190	0.1603	0.6641	0.3525	0.4717

*SBP-systolic blood pressure, DBP-diastolic blood pressure.

Table 3: Intergroup Blood Pressure Changes (SBP&DBP)

However, Mean SBP and Mean DBP increases in both the groups as compared to baseline but significantly increases after 1 min of insertion of devices and which was more in group 1(ETT), highly significant difference (p=0.004 and 0.003) seen in Mean SBP and DBP respectively after 1 min of insertion of devices**.** There was no statistical difference in blood pressure between two groups after extubation. **(Figure 3)**

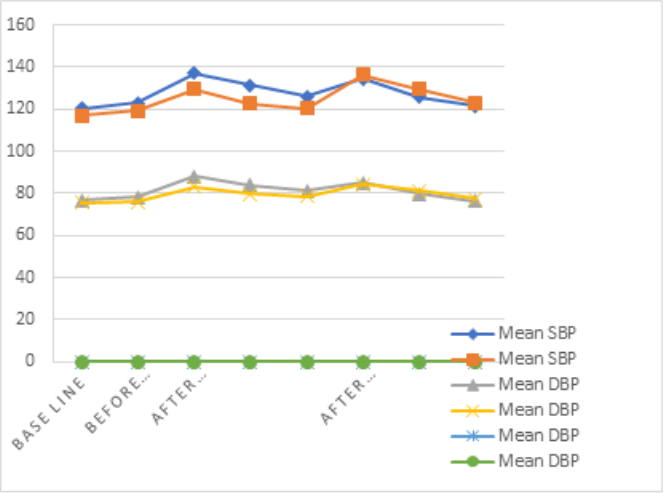

Figure 3: SBP AND DBP Changes in Both the Groups.

There was no statistically significant difference (p value>0.05) between two group in terms of post-operative pharyngolaryngeal morbidity like sore throat, hoarseness of voice, coughing, and dysphagia with respect to post-operative hours of surgery till 24 hours seen in Table 4.

Variable	Group 1 (n-50) %				Group 2 (n-50) %			
Postoperative duration	2nd hr.	6th hr.	12th hr.	24th hr.	2nd hr.	6th hr.	12th hr.	24th hr.
Coughing (Absent/Present)	41/9 (82/18)	44/6 (88/12)	49/1 (98/2)	50/0 (100/0)	43/7 (86/14)	45/5 (90/10)	49/1 (98/2)	50/0 (100/0)
Blood On Device (Absent/Present)	46/4 (92/8)	47/3 (94/6)	50/0 (100/0)	50/0 (100/0)	45/5 (90/0)	48/2 (96/4)	50/0 (100/0)	50/0 (100/0)
Hoarseness (0/1/2/3)	44/4/2/0 (88/8/4/0)	44/4/2/0 (88/8/4/0)	46/3/1/06t (92/6/2/0)	47/2/1/0 (94/4/2/0)	45/4/1/0 (90/8/2/0)	46/3/1/0 (92/6/2/0)	46/3/1/0 (92/6/2/0)	48/2/0/0 (94/4/0/0)
Sore Throat (0/1/2/3)	44/4/2/0 (88/8/4/0)	45/4/1/0 (90/8/2/0)	45/5/0/0 (90/10/0/0)	49/1/0/0 (98/2/0/0)	43/4/3/0 (86/8/6/0)	45/3/2/0 (90/6/4/0)	47/2/1/0 (94/4/2/0)	50/0/0/0 (100/0/0/0)
Difficulty In Swallowing (Absent/present)	45/5 (90/10)	45/5 (90/10)	46/4 (92/8)	48/2 (96/4)	44/6 (88/12)	48/2 (96/4)	50/0 (100/0)	50/0 (100/0)

Table 4: Pharyngolaryngeal Morbidity.

In the study, coughing after removal of devices and blood on devices hoarseness of voice, sore throat and dysphagia were more seen in ETT group than ILMA group. Mucosal trauma occurred in 5% of patients in ILMA at 2nd hour and 2% at 6th hour which is low comparatively to direct laryngoscopy. Incidence of sore throat in ILMA is less at 2nd, 6th and 12th hour of postoperative period.

Grading of severity of postoperative sore throat	
0(Absence)	Absence of sore throat
1(Minimal)	Complaint of sore throat, when being asked.
2(Moderate)	Complaint of sore throat on his own.
3(Severe)	Patient is in distress.
Grading severity of postoperative hoarseness	
0(Absence)	No complaint of hoarseness after OT.
1(Minimal)	Minimal change in quality of speech. Complaint only when being asked.
2(Moderate)	Moderate change in quality of speech of which the patient complains on his/her own.
3(Severe)	Gross change in the quality of voice perceived by the observer

Table 5: Grading of Post-Operative Sore Throat & Hoarseness.

The gradings of the sore throat and hoarseness were according to this table for pharyngolaryngeal morbidity.

Discussion

In this study we compared both ILMA and ETT, both are effective and safe devices for use as a primary conduit during positive pressure ventilation. Although ILMA was easier to insert with success rate-92% (94% for ETT) in first attempt,8% (6% for ETT) in second attempt, this was not statistically significant as shown in Table 1. Seyd Akhlagh et al [12] found that intubations via DL was performed on first attempt in all patient (n=40) while intubation with ILMA was performed on the first (n = 31), second (n = 6) or third (n = 3) attempts until performing successful intubation. Kapila et al [13] using ILMA in ASA grade I and II patients noted 1st attempt success rate of 100%. And Chan et al [14] used ILMA in Asian patients with normal airway and noted a first attempt success rate of 100%.

Effective airway mean time taken for successful placement was 33.03s and 31.43s for groups 1 and 2 respectively, which is statistically have no significant

difference in insertion characteristics of airway device. Nileshwar et al [26] found that effective airway mean time in ETT group was 84s and in ILMA group 76.04s.

Oropharyngeal leakage pressure (OLP)is a gas leak occurring around the airway device. The verification of the position of the airway device shows the success of positive-pressure ventilation and the degree of airway protection and effectiveness of different airway devices. Seet et al [27] reported that OLP was 21 cmH_20 in 99 cases in which the LMA-S was used with an intra cuff pressure of 60 cmH_20. Kim et al [28] found in 100 patients that OLP was higher in the laryngoscope guided LMA group (21.4± 8.6 cmH_20) than in Blind insertion group (18.1±6.1 cmH_20). In our study, the OLP was measured at insertion as 24.68 cmH_20 in ETT Group and 26.40 cmH_20 in ILMA group. After 30 mins, OLP was measured as 25.04 cmH_20 in ETT group and 28.46 cmH_20 in ILMA group, and did not differ between the groups. In summary, the OLP values in these studies are consistent with our OLP values.

Direct laryngoscopy and endotracheal intubation induce the patient's cardiovascular system reaction, due to reflexive responses and the physiological presence of an endotracheal tube and is probably due to the glosso-epiglottic fold stimulation through laryngoscopy. [10,15] The ILMA facilitates tracheal intubation without laryngoscopy. [1,13] In our study hemodynamic response in terms of HR, SBP, DBP & MAP were observed. All the parameters were comparable between both the groups. Our study shows that mean HR was seen to increase in both groups but statistically significant increase was noted in ETT (Group 1) at 1, 3 & 5 min after intubation in comparison to ILMA (Group 2). There was very highly significant difference in($p<0.0001$) Mean the fact that ILMA stimulates both cardiac acceleratory and vagal fibers whereas cardio acceleratory fibers much more prominent on ETT. Our study's findings correlated with study done by Bhawana Rastogi et al. [18]. Also, Hribman et al. [16] found that the plasma catecholamine levels and haemodynamic stress response to 10 seconds laryngoscopy were similar to laryngoscopy followed by tracheal intubation. This study suggests, the laryngoscopy is responsible for haemodynamic stress response rather than the intubation. Bharti et al [17] compared hemodynamic responses to intubation through conventional laryngoscopy and through ILMA. They noted that there was a significant increase in HR from baseline after tracheal intubation in both the groups.

However, the SBP and DBP increased significantly after tracheal intubation in ETT group. The Systolic BP increased (13.96% in group ETT Versus 10.03% in Group ILMA) and Diastolic BP increased (14.88% in group ETT versus 10.34% in group ILMA) immediately after insertion. As seen from these values, group ILMA has lower increase in SBP and DBP than the ETT group. This may be due to decreased total stimulation of afferent fibers in ILMA group. In contrast to our study results, Zhang et al [25] noticed that orotracheal intubations by using ILMA and direct laryngoscope produced similar haemodynamic response. ILMA had no advantage in attenuating the haemodynamic responses to orotracheal intubation compared with direct laryngoscopy.

There are two types of ETT Cuffs: HPLV (High Pressure Low volume) cuff and another is LPHV (Low Pressure High Volume) cuff. ILMA group has HPLV cuff ETT and we use ETT with brand pilot balloon has LPHV cuff. Advantage of HPLV, lower incidence of sore throat over LPHV cuff tube which provide better protection against aspiration. Intracuff pressure should keep the cuff-

tracheal wall contact pressure below the capillary perfusion pressure which is 50 cmH2O.

Figure 4: ILMA Tube (HPLV) cuff pressure monitor.

Figure 5: ETT Tube (LPHV) cuff Pressure monitor.

The sealing pressure suggests index of airway and respiratory mechanics. The inflatable cuff has often been held responsible for the device related complications or laryngopharyngeal co-morbidity. However, in this study we did not observe any significant difference between ILMA and DL, coughing, hoarseness of voice, mucosal bleeding. Injuries to the larynx relating to long lasting pain or voice complaints due to nerve apraxia and cartilage trauma.[8] blood on device shows significantly low in ILMA. Sore throat significantly low in ILMA at 2th, 12th and 24th hour of post operative is due to mucosal pressure achieved below pharyngeal perfusion pressure. Joo and Rose [21] reporting there was no significant difference between the ILMA and DL in terms of complications. The result of Kihara et al [19] & Masoomeh Tabari [20] also shows similar results.

Postoperative sore throat among pharyngolaryngeal adverse events that commonly occur after general anaesthesia, decreasing patient's satisfaction and causing prolonged hospital stays.in addition to the direct trauma of the rigid materials that are inserted in upper airway, the physical tension caused by the laryngoscopy, tube size, cuff pressure may cause postoperative sore-throat.

All patients with sore throat were administered gargles and steam inhalation. In our study, sore throat, hoarseness and mucosal trauma were minimal (Grade 1) [22] in all cases consultant after 48 hours was performed to rule out any consequences. Cuff pressure monitoring done as a standard practice plays an important role to reduce adverse outcomes of pharyngolaryngeal morbidity.[23] The virtual absence of sore throat in ILMA group may be explained by the fact that it is a supraglottic device and mucosal pressures achieved are usually below pharyngeal perfusion pressures.[24]

Limitations of our study is being an open-label trial, observer bias inherent to study design could not be ruled out. There might be subjective variation due to different types of material (PVC and wire reinforced silicone) used in airway devices. Also because of unavailability of flexible bronchoscope, the presence of blood at the vocal cord level was evaluated only visually i.e., by presence of blood on cuff after extubation. The amount of bleeding in the airway could not be measured because of risk of undesirable airway reflexes like laryngospasm and bronchospasm and chances of aspiration.

Further studies and research on a larger sample size using ILMA as standard airway adjunct in emergency

department can be carried. Also, comparision of the use of ILMA and other supraglottic devices in hypertensive patients, where intubation pressure response preferably be avoided in the surgical procedures (e.g., Laparoscopy) can be done. ILMA may be useful for intubation in patients with limited cervical spine movements or difficult airway by comparing other airway devices.

Conclusion

This study concludes that both ETT and ILMA are useful for airway management in patients undergoing surgery under general anaesthesia. Incidence of insertion characteristics (attempts of insertion, effective airway time) and pharyngolaryngeal morbidity were comparable in both the groups. Also, ILMA is a reliable and better alternative with the advantage of ability to ventilate a patient in case of inability to intubate as well as attenuating the haemodynamic responses and catecholamine release.

References

1. Brain AIJ, Verghese C, Addy EV, et al. The intubating laryngeal mask. I. Development of a new device for intubation of the trachea. Br J Anaesth 1997; 79: 699–703.
2. Prys Roberts C, Green LT, Meloche R, Foex P. Studies of anaesthesia in relation to hypertension II: Hemodynamic consequences of induction and endotracheal intubation. Br J Anaesth 1971; 43: 531-47
3. Nakazawa K, Tanaka N, Ishikawa S, et al. Using the Intubating Laryngeal Mask Airway (LMA-Fastrach ™) for Blind Endotracheal Intubation in Patients Undergoing Cervical Spine Operation. Anesth Analg 1999; 89: 1319-21.
4. Rosenblatt WH, Murphy M. The Intubating Laryngeal Mask: Use of a New Ventilating Intubating Device in the Emergency Department. Ann Emerg Med 1999; 33(2) 234-38
5. Brimacombe J, Newell S, Swanston R, Thompson J. A potential new technique for awake fiber optic bronchoscopy: Use of laryngeal Mask airway. Med J Ausdx 1992; 156:876
6. Shahin JN, Alam M, Usmani H, Khan MM. A study of use of laryngeal mask airway (LMA) in children and its comparison with endotracheal intubation. Indian J Anaesth 2009; 53:174-8.
7. Afzal M. Airway Management in paediatric anaesthesia: Laryngeal mask airway v/s endotracheal tube. Int J Anaesthesia vol. 13, 2007
8. Domino KB, Posner KL, Caplan RA, Cheney FW. Airway injury during anaesthesia: A closed claims analysis. Anaesthesiology. 1999; 91:1703–11
9. Macario A, Weinger M, Carney S, Kim A. Which clinical anaesthesia outcomes are important to avoid? The perspective of patients? Anesth Analg. 1999; 89:652–8
10. Russel WJ, Morris RG, Frewin DB, Drew SE. Changes in plasma catecholamine concentrations during endotracheal intubation. Br J Anaesth 1981; 53: 837-99
11. Derbyshire DR, Chmielewski A, Fell D, Vater M, Achola K, Smith G. Plasma catecholamine responses to tracheal intubation. Br J Anaesth 1983; 55: 855-9.
12. Syed Hedayatallah Akhlagh, Mohamm ad Taghy Moeen Vaziri, Tooran Masoumi and Sanam Javid Anbardan. Hemodynamic response to tracheal intubation via direct laryngoscopy and intubating laryngeal mask airway (ILMA) in patients undergoing coronary artery bypass graft (CABG). M.E.J. ANESTH 21 (1), 2011,99-103.

13. Kapila A, Addy EV, Verghese C, et al. The intubating laryngeal mask airway: an initial assessment and performance. Br J Anaesth 1997; 79: 710–3.
14. Chan YW, Kong CF, Kong CS, Hwang NC and Ip-Yam PC. Intubating laryngeal mask airway: initial experience in Singapore. British Journal of Anaesthesia 1998; 81: 610-611.
15. King BD, Harris LC, Grefiesnstein FE, Elder JP. Reflex circulatory responses to direct laryngoscopy and tracheal intubation performed during general anaesthesia. Anaesthesiology 1951; 12:556–66.
16. Shribman AJ, Smith G, Achola KJ (1987) Cardiovascular and catecholamine responses to laryngoscopy with and without tracheal intubation. Br J Anaesth 59: 295-299.
17. Bharti N, Naik AK. Ease of insertion and haemodynamic effects following tracheal intubation using intubating laryngeal mask airway: A comparison with conventional Macintosh laryngoscope. Indian J Anaesth 2006; 50 (3): 205-208.
18. Bhawana Rastogi*, Singh VP, Alok Gandhi, Manish Jain, Kumkum Gupta, Meetu Singh, Waris Majid and Deepak Sharma. Comparative evaluation of hemodynamic response with intubating laryngeal mask airway and intubation with Macintosh Blade-A prospective study. Glob Anesth Perioper Med, 2015, Volume 1(2): 34-39.
19. Nakazawa K, Tanaka N, Ishikawa S, et al. Using the Intubating Laryngeal Mask Airway (LMA-Fastrach TM) for Blind Endotracheal Intubation in Patients Undergoing Cervical Spine Operation. Anesth Analg 1999; 89: 1319-21.
20. Masoomeh Tabari, Mohammad Alipour, Mahdi Ahmadi. Hemodynamic changes occurring with tracheal intubation by direct laryngoscopy compared with intubating laryngeal mask airway in adults: a randomized comparison trial. Egyptian Journal of Anaesthesia (2013) 29, 103–107
21. Joo HS and Rose KD. The intubating laryngeal mask airway with and without fibreoptic guidance. Anesth Analg 1999; 88: 662–6.
22. Rajan S, Malayil GJ, Varghese R, Kumar L. Comparison of usefulness of ketamine and magnesium sulphate nebulization for attenuating postoperative sore throat, hoarseness of voice, and cough. Anesth Essays Res 2017; 11:287-93.
23. A. Venugopal, Ron Mathew Jacob, and Rachel Cherian Koshy. A randomized control study comparing the pharyngolaryngeal morbidity of laryngeal mask airway versus endotracheal tube. Anesth Essays Res. 2016 May-Aug; 10(2): 189–194.
24. Kihara S, Brimacombe J, Yaguchi Y, Watanabe S, Taguchi N, Komatsuzaki T. Hemodynamic responses among three tracheal intubation devices in normotensive and hypertensive patients. Anesth Analg 2003 Mar; 96(3): 890-5.
25. Zhang GH, Xue FS, Sun HY, et al. Comparative study of hemodynamic responses to orotracheal intubation with intubating laryngeal mask airway and direct laryngoscope. Chin Med J 2006; 119 (11): 899-904.
26. A. Nileshwar, A. Thudamaladinne, et al. comparision of intubating laryngeal mask airway and Bullard laryngoscope for Oro-tracheal intubation in adult patients with simulated limitation of cervical movements. British Journal of anaesthesia 99(2):292-6-(2007).

27. Seet E, Rajeev S, Firoz T David T. Safety and Efficacy of laryngeal mask airway supreme versus laryngeal mask airway Proseal™ a randomized controlled trial. Eur J Anaesthesiol. 2010; 27:602-7.
28. Go WU Kim, Jong Yeop Kim, Soo Jin Kim, Yeo Rae Moon, et al. Conditions for laryngeal mask airway placement in terms of oropharyngeal leak pressure: a comparision between blind insertion and laryngoscope guided insertion. BMC Anesthesiology (2019) 19:4-5.