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PROSEAL-LARYNGEAL MASK AIRWAY VERSUS ENDOTRACHEAL INTUBATION FOR MAINTAINING GENERAL ANAESTHESIA IN PATIENTS UNDERGOING LAPAROSCOPIC SURGERY

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ABSTRACT **INTRODUCTION:** Laparoscopic surgery is an evolving subspecialty and is not only limited to minor gynaecological surgeries or cholecystectomy. Endotracheal intubation is the overall accepted "gold standard of securing the airway". The hemodynamic response induced by laryngoscopy and intubation can be avoided by inserting supraglottic airway devices such as LMA. ProSeal laryngeal mask airway (PLMA), a modification of classic LMA with a modified cuff design, has a gastric drainage tube placed lateral to main airway tube allowing the regurgitated gastric contents to bypass the glottis.

METHODS: 60 adult ASA I & II patients of 18-60 years, posted for laparoscopic surgery were divided into group P (PLMA) and group E (Endotracheal tube). The outcome studied were insertion characteristics of the devices hemodynamic responses, oxygenation and ventilation, oropharyngeal seal pressure, incidence of gastric distension and any laryngo-pharyngeal morbidity.

RESULTS: The insertion characteristics and ventilation and oxygenation between both the groups were comparable. PLMA caused lesser hemodynamic changes after insertion than ET tube. Data regarding oropharyngeal seal pressure, gastric distension and laryngo-pharyngeal morbidity were comparable in both groups.

CONCLUSION: The ProSeal Laryngeal Mask Airway is an effective and safe alternative of Endotracheal Tube duringlaparoscopic surgery under general anaesthesia.

KEYWORDS : ProSeal LMA, Endotracheal tube, Laparoscopic surgery

INTRODUCTION

The introduction of classic laryngeal mask airway (CLMA) by Dr. Archie Brain in 1981 was a milestone in the history of anaesthesiafilling the niche between the variably effective, non sealed, easy to insert oropharyngeal airway and almost invariably effective sealed and relatively difficult to insert Endotracheal tube[1]. ProSeal laryngeal mask airway (PLMA), a modification of classic LMA with a modified cuff design to improve its seal, has a gastric drainage tube placed lateral to main airway tube allowing the regurgitated gastric contents to bypass the glottis and prevent pulmonary aspiration[2].

Endotracheal intubation is the overall accepted "gold standard of securing the airway and providing adequate ventilation". Direct laryngoscopy and endotracheal intubation following induction of anaesthesia is almost always associated with hemodynamic changes due to reflex sympathetic discharge caused by epipharyngeal and laryngopharyngeal stimulation causing most intense stress to patient. This increase sympathoadrenal activity may result in hypertension, tachycardia and arrhythmias. This transitory hypertension and tachycardia are probably of no consequence in healthy individuals but either or both may be hazardous to patients with cardiovascular and cerebrovascular diseases causing severe complications.It is necessary to blunt these harmful laryngoscopic reactions in such individuals. This hemodynamic and catecholamine response induced by laryngoscopy and intubation can be avoided by inserting supraglottic airway devices[3].

Laparoscopic surgery is an evolving subspecialty and is not only limited to minor gynaecological surgeries or cholecystectomy, but has extended to other surgical procedures such as appendicectomy, hernia repairs (inguinal, epigastric and incisional), advanced gastrointestinal, urological and gynaecological procedures.

The main problemin these procedures is raised intra abdominal pressure[4]and thusincreasing potential risk of regurgitation and aspiration. It has proven from previous studies that PLMA can be used effectively in laparoscopic surgeries where the chances of aspiration is more and it provides more effective seal around the glottis than the classic LMA and the drain tube provides a bypass channel for regurgitated gastric contents[5,6].

Keeping these factors in mind this study was planned to see the efficacy and safety of ProSeal laryngeal mask airway in comparison with endotracheal tube in patients undergoing laparoscopic surgeries.

AIMS AND OBJECTIVES:

1. To study ProSeal laryngeal mask airway insertion for maintenance of general anaesthesia in patients undergoing laparoscopic surgery.
2. To record and assess
   - Ease of insertion
   - Number of attempts
   - Time taken
   - Haemodynamic changes, oxygenation (SpO2), ventilation (EtCO2).
3. To compare the observations with those recorded during standard endotracheal tube insertion.
4. To study Intra-operative and post-operative laryngo-pharyngealmorbidity (LPM) in both groups, if any.

MATERIALS AND METHODS:

After approval of Institutional Ethical committee and obtaining written informed consent from all the patients, this prospective randomized study was conducted in 60 adult ASA I & II patients aged between 18-60 years, posted for laparoscopic surgery under general anaesthesia.

Patients with anticipated difficult airway, oropharyngeal pathology, cardiopulmonarydisease, cervical spine fracture or instability, risk of aspiration (GERD, Hiatus hernia & pregnancy) were excluded from the study.

After a computer generated randomization,Patients were randomized into two groups:
Group P: airway was secured with ProSeal LMA (PLMA)
Group E: airway was secured with Endotracheal Tube (ETT)

All the patients were kept fasting one night prior to surgery and received tablet Alprazolam 0.5 mg on the night before surgery and tablet Ranitidine 150 mg on the night before and two hours before the scheduled time of surgery.

In the operation theatre, after obtaining intravenous access, standard monitors like electrocardiography, non invasive blood pressure, pulse oximetry were attached and baseline heart rate, systolic, diastolic and mean blood pressure, arterial oxygen saturation were recorded. Inj. Glycopyrrolate 0.004 mg/kg, Inj Ondansetron 0.1mg/kg and Inj Fentany l -2µg/kg was administered intravenously (i.v.) 2 minutes before induction. After preoxygenation with 100% O2 for 3 minutes, anaesthesia was induced with Inj. Propofol 2mg/kg i.v. till the loss of verbal response. Neuromuscular blockade to facilitate placement of airway device was achieved by Inj. Vecuronium 0.1 mg/kg i.v. Following induction and adequate paralysis, Intermittent Positive Pressure Ventilation was done for 4 minutes and the corresponding airway device was inserted by same person in all patients.

In group P, size 3 or 4 ProSeal LMA (according to weight) was used. For the purpose of standardisation, introducer was used for inserting the PLMA as recommended by the manufacturer.

In group E, endotracheal intubation (7.5- 8.0mm ID in females & 8.0-8.5mm ID in males) was performed in a standard manner.

The time interval between holding the airway device up to confirming the correct placement by bilateral equal air entry on chest auscultation was noted as the insertion time for the particular device.

Correct placement of devices was confirmed by adequate chest movements and square wave capnography. Additionally for the PLMA groupLeak test and Gel displacement test were performed as follows:

- The drain tube was inspected for any audible leak. A leak below 20 cm of H_2O PAP was taken as significant and suggests malposition.
- Gel displacement test was done by placing a blob of gel at the tip of the drain tube and noting the airway pressure at which it was ejected.

Anaesthesia was maintained with O_2, N_2O and Sevoflurane&Inj. Vecuronium i.v. A 14G Ryle's tube was inserted in all cases. After the placement of device the head and neck area of the patients was covered to blind the surgeon regarding the airway device used, for grading of stomach size.Ventilatory parameters were set at a tidal volume of 8-10 ml/kg, FiO2 33 % with nitrous oxide, respiratory rate 12-14/min, I/E ratio of 1:2. The aim was to maintain target SpO2 > 95% and EtCO2 < 45 mmHg. The oxygenation was termed as suboptimal when SpO2 was 90-94% and failed if it was <90%. The ventilation was termed as optimum if EtCO2 levels were below or equals to 45 mm of Hg, it was termed sub optimal if EtCO2 between 45-55 mm of Hg and failed if EtCO2 > 55 mm of Hg.After the laparoscopic surgery, the neuromuscular blockade was reversed by Inj. Glycopyrrolate 0.08 mg/kg i.v. and Inj. Neostigmine 0.05 mg/kg i.v.

The outcomes measured were:

1) Insertion characteristics of the PLMA or ETT
i) Time taken for insertion of device
ii) Ease of insertion of airway device was graded as
a) easy insertion- insertion at first attempt with no resistance
b) difficult insertion- insertion with resistance or second attempt
c) failed insertion
2) Insertion characteristics of Ryle's tube were noted in the form of time taken for insertion of Ryle's tube.
3) Hemodynamic response viz Heart rate, Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP)& Mean Arterial Pressure (MAP) were recorded before premedication, after premedication, before putting device, after putting device, 1 and 5 minutes after insertion of device, before the insufflation of CO_2 ,10 minutes after the CO_2 insufflation and after the removal of airway device.
4) Oxygen saturation (SpO_2) and end-tidal carbon dioxide (EtCO2) level were recorded.
5) Oropharyngeal seal pressure was determined in the PLMA group at fixed gas flow of 5 litres per min by closing the expiratory valve of the CO_2 circle system and recording the airway pressure at which equilibrium was reached (Maximum 40 cm of H_2O to avoid barotrauma).
6) The Peak Airway Pressure (PAP) was recorded at the 5 minutes after the insertion of airway device, before CO_2 insufflation and immediately after the insufflation of CO_2. For standardisation, intra abdominal pressure was maintained at 12-16 mmHg.
7) Incidences of gastric distension as informed by surgeons were noted in both the groups at the time of insertion of laparoscope. Surgeons graded the gastric insufflation on a 4 point score (0= no gastric insufflation; 1 = minimal gastric insufflation not interfering with surgery; 2 = interfering with surgery, but not necessitating change of device; 3= interfering with surgery and necessitating change of device)
8) Intra operatively drain tube was checked for any regurgitation in both the groups. Auscultation of chest was done in all the cases to rule out any incidence of aspiration in both the groups.
9) In the postoperative period the laryngopharyngeal morbidity (LPM) in the form of sore throat (defined as constant pain or discomfort at the throat independent of swallowing), dysphagia (difficulty or pain provoked by swallowing) & dysphonia (difficulty or pain on speaking)were assessed and recorded.Other morbidities liketrauma to lip, tongue, teeth and incidence of postoperative nausea and vomiting (PONV) if any, were recorded and noted in both groups. Secretions if present over both the dorsal and ventral cuff of PLMA were noted. The Research Assistantwho recorded all the readings was blinded to the type of airway device used.

Statistical Analysis:The primary variables studied were oxygenation and adequacy of ventilation. Sample size was calculated using a two sided test with $\alpha = 0.05$ and the power of 0.9. Two sided independent Student's t test was used to analyse the continuous data. $p < 0.05$ was considered as significant.

RESULTS

All the demographic datainclude Age, Sex distribution and Weight were comparable between the two groups (Table1).

Table 2 shows the distribution of study population in regards to surgery performed. Present study was performed in laparoscopic cholecystectomy (75%) and laparoscopic appendicectomy (25%).

The insertion characteristics of both the airway devices are tabulated in Table 3. In Group P 26 patients (86.66 %) were intubated in first attempt. In group E 25 patients (83.34%) were intubated in first attempt. More than one attempt was required in 4 patients in Group P and 5 patients in Group E.The time taken for insertion of both deviceswas not statistically significant.The time taken in insertion of Nasogastric tube in both the groups was not statistically significant.

Table 4 shows hemodynamic changes at different time intervals in both the groups as compared with each other. The maximum increase in heart rate just after insertion of PLMA in group P was 83.90 ± 13.30 and after insertion of tube in group E was 91.40 ± 9.67. After 1 min the increase was 83.90 ± 13.30 in group P and was 91.37 ± 10.92 in group E. After the removal of device it was 88.10 ± 15.25 in Group P whereas it was 94.60 ± 7.03 in group E. There is a significant difference between the two groups just after the insertion of device up to 5 mins and after the removal of device ($p < 0.05$).

The maximum increase in SBP seen after insertion of PLMA in group P was 109.57 ± 14.82 and in after intubation in groupE it was 144.13 ± 22.50. After 1 min of insertion of device it was 107.37±13.95 in group P and 137.50 ± 20.66 in group E. After 5 mins the SBP was 103.03 ± 12.13 in group P and it was 127.54 ± 16.54 in group E. After the removal of airway device the SBP was 134.57 ± 17.44 in group P and 144.47 ± 13.92 in group E.There is significant difference between two groups from just after intubation upto 5 mins and after the removal of device ($p < 0.05$). Group P showed a DBP of 67.17 ± 10.53 just after insertion of PLMA, while group E showed 93.97 ± 16.33. After 1 min group P had DBP of 65.43 ± 10.39 & group E had 86.10 ± 16.08. After 5 min the reading was 63.77 ± 9.89 and 79.27 ± 14.22 in group P and group E respectively. After the removal of airway device the DBP was 80.37 ± 9.93 in group P and 89.40 ± 8.98 in group E. There was a statistically significant difference in group P and group E ($p < 0.05$) from just after intubation upto 5 mins and after removal of airway device. Similar changes in mean arterial pressure (MAP) were seen in both the groups which were statistically significant. After insertion of PLMA , group P shows a change of 83.70 ± 13.47 while group E shows MAP of 110.17 ± 18.95. After 1 min of intubation, group P showed MAP of 80.87 ± 11.21 while it was 103.90 ± 16.92 in group E. At the end of 5 mins group P had a MAP of 78.07 ± 10.12, while group E had 96.33 ± 13.29. After the removal of airway device the MAP in group P was 100.80 ± 13.72 and 107.07 ± 12.04 in group E. There was a significant difference ($p < 0.05$) in MAP in both the groups.

Table 5 shows no statistical significant difference in saturation at various intervals in the intraoperative period in both the groups.

Table 6 shows the ventilation efficacy in both the groups. 3 patients of Group P and 2 patients of Group E experienced an EtCO2 levels of more than 45 mm of Hg termed as suboptimal ventilation.

Morbidity profiles are tabulated in Table 7.In our study there is no statistical significance found when LPMand trauma to lip, tongue, and oral cavity werecompared in two groups. Postoperative nausea vomiting was seen in16.67 % patients in Group P and 40 % patients in Group E. The values were statistically significant.

DISCUSSION

The ProSeal laryngeal mask airway (PLMA) has proved to be a popular addition to the range of equipments available for airway management in laparoscopic surgeries. PLMA acquires good seal in supraglottic region, and permits the gastric drainage hence separating the respiratory tract from the gastro-intestinal tract. It also reduces the complications associated with conventional laryngoscopy and intubation. These properties make it a useful device for laparoscopic surgeries.

Time taken in insertion of PLMA is lesser than the ETT is further supported by the previous studies by P P Shroff et al[7] (2006) and Y Lim, S Goel et al[8] (2007).

In our study, the baseline hemodynamic variables (Heart Rate, Systolic Blood Pressure, Diastolic Blood Pressure and Mean Arterial Pressure) were comparable between the two groups.Immediately after insertion and 1 min after the insertion of respective device all the above mentioned variables were significantly higher in group E as compared to group P and five minutes after the insertion of device systolic, diastolic and mean arterial pressures remained significantly higher in group E whereas the Heart rate in both the groups were comparable.Decreased hemodynamic response to laryngeal mask airway insertion has been extensively reported by previous researchers BimlaSharma et al[6] (2003), Amita N Shetty et al[9] (2004), Y Lim et al[8](2007) and Namita Saraswat et al[10](2011) especially during introducing and removal of airway devices. This decreased hemodynamic response to PLMA insertion compared to tracheal intubation presumably reflects a lesser degree of total afferent stimulation.

Hemodynamic variables recorded before and after pneumoperitoneum were comparable in both the groups. Roth et al[11] (2005) concluded that both PLMA and LTS provide a secure airway even under conditions of elevated intra-abdominal pressure. They found no differences concerning handling or quality of airway seal provided by both devices.

Increased intraabdominal pressure in laparoscopic surgery leads to improper oxygenation and ventilation. Any airway device being used for laparoscopic surgeries must ensure adequate oxygenation and ventilation. In this study regarding adequacy of oxygenation and ventilation, none of the patients were observed SpO2 levels less than 94 %. After the CO2 insufflation 3 patients in PLMA group and 2 patients in ETT group showed suboptimal ventilation and showed ETCO2 levels more than 45 mm of Hg but that was corrected by adjusting the ventilatory parameters. Rest of the patients showed ventilator adequacy in both the groups.

P P Shroff et al[7](2006), Bimla Sharma et al[6] (2008) and Namita Saraswat et al[10] (2011) have also reported that the PLMA is equally effective airway device as that of ETT in laparoscopic surgeries. Thus it can be said that PLMA provides effective ventilation and oxygenation at par with ETT in laparoscopic surgeries.

The increased oropharyngeal seal pressure (OSP) of ProSeal LMA protects against significant ventilator leaks during the periods of pneumoperitoneum with elevated peak airway pressures without significant gastric insufflation. In the present study a median OSP in group P was 33.53(30-36) cm of H_2O. The peak airway pressure recorded before (14.13 ±0.93) and after (15.2 ± 1.18) insufflation of CO_2in group P and in group E before(13.27±1.31) and after(15.3 ± 1.6) cm of H_2O insufflation of CO_2were comparable. The PLMA formed an effective seal around the glottis in our patients as evidenced by adequate oxygenation and ventilation throughout the duration of carboperitoneum. BimlaSharma et al [6] (2008) found a median OSP of 36 cm of H2O and Namita Saraswat[10](2011) found a median OSP of 35 cm of H2O.

There was no incidence of intraoperative displacement of device. In the present study gastric insufflation was reported by the surgeons blinded to the type of airway device at the time of insertion of trocar. The degree of gastric insufflation was comparable in both groups of patients and none patient in the PLMA group had gastric insufflation interfering with the surgery or requiring the change in device. Maltby et al[5] (2003) concluded that a correctly placed LMA-C or PLMA is as effective as an ETT for positive pressure ventilation without clinically important gastric distension in non-obese and obese patients undergoing gynaecological laparoscopy. A Chakraborty et al[12] (2007)concluded that the incidence of gastric distension is lower in patients with ProSeal LMA than with endotracheal intubation.

Patients undergoing laparoscopic surgeries might be considered to be at increased risk of developing the acid aspiration syndrome. However, the increased intra abdominal pressure results in increase in the tone of the lower esophageal sphincter which allows maintenance of the pressure gradient across the gastroesophageal junction and which might therefore reduce the risk of regurgitation[6]. Regurgitation of gastric contents through the drain tube was not noted in any of the patients in both the groups. No case of pulmonary regurgitation and aspiration was noted as evidenced by chest auscultation, adequate oxygenation and maintenance of ETCO2 levels throughout the perioperative period.

In a case reported by Evans NR et al[13](2002) it was seen that the PLMA prevented the aspiration because the pressure generated during passive gastroesophageal regurgitation is normally less than 10 cm of H_2O and rarely it exceeds 30 cm of H_2O. Therefore PLMA is expected to protect the glottis during passive regurgitation.

In the present study, we compared both airway devices for the incidences of sore throat, dysphagia, dysphonia, trauma to lip, tongue and teeth by inspection of oral cavity and the device for blood staining. On comparative evaluation no statistically significant differences were noted between both groups.

In our study, 16.67 % of patients complained of postoperative nausea vomiting (PONV) in group P whereas it was seen in 40.0% of patients in group E which was statistically significant (table 7). Similar results were obtained by M. Hohlreider et al[14] (2007) who concluded thatthe frequency of postoperative nausea, vomiting, airway morbidity, and analgesic requirements was lower for the ProSeal LMA than the tracheal tube in females undergoing breast and gynaecological surgery. Although tracheal intubation remains the gold standard in patients for emergency surgery with increased risk of aspiration, the ProSeal laryngeal mask airway has been used for laparoscopic and other elective abdominal surgeries and for the management of difficult airways.

Our study supports the safety of ProSeal laryngeal mask airway in commonly performed laparoscopic procedures as it safely isolates the respiratory tract from the gastrointestinal tract. In experienced hands and following a strict protocol of insertion, the ProSeal laryngeal mask airway is an efficient and safe tool for airway management of electively fasting patients undergoing laparoscopic abdominal surgery.

CONCLUSION

Based on the results of our study, we conclude that the ProSeal Laryngeal Mask Airway is an effective and safe alternative of Endotracheal Tube during laparosopic surgery under general anaesthesia with controlled ventilation. The ProSeal laryngeal mask airway insertion is quicker and it aids easy and rapid insertion of the nasogastric tube under general anaesthesia. Hemodynamics response is less with the use of PLMA at the time of insertion as well as at extubation. ProSeal laryngeal mask airway causes less incidences of postoperative nausea vomiting as compared to endotracheal tube. Complications such as sore throat, dysphagia, dysphonia and trauma to oropharyngeal structures are comparable with the use of Proseal laryngeal mask airway and Endotracheal tube.

PLMA thus may offer a reliable airway management option for patients undergoing laparoscopic procedures under general anaesthesia with controlled ventilation.

Table 1: Demographic Variables

Variables	Group P		Group E	
	No.	%	No.	%

Age (Yrs)				
18-29	4	13.3	6	20.0
30-39	4	13.3	3	10.0
40-49	9	30.0	9	30.0
50-60	13	43.3	12	40.0
Mean	45.13	43.73		
S.D.	12.29	11.99		
Weight (Kg)				
50-59	15	50.0	12	40.0
60-70	15	50.0	18	60.0
Mean	59.93		61.43	
S.D.	5.56		7.12	
Gender				
Male	15	50.0	14	46.0
Female	15	50.0	16	54.0

Table 2: Type of Surgical intervention

Type of surgery	Group P		Group E		Total	
	No.	%	No.	%	No.	%
Appendicectomy	08	26.67	07	23.33	15	25
Cholecystectomy	22	73.33	23	76.67	45	75

Table 3: Insertion Characteristics

Variables	Group P		Group E	
	No.	%	No.	%
Ease of insertion/ Attempts				
1st Attempt	26	86.66	25	83.34 %
2nd Attempt	4	13.34	5	16.66 %
Time taken in insertion (seconds)				
Mean	14.76		15.53	
SD	2.23		0.89	
Time taken in insertion in Nasogastric Tube				
Mean	11.37		12.67	
S.D.	2.74		2.45	

Table 4:Hemodynamic Response

Hemodynamic Response	**Baseline**	**After premedication**	**Before insertion**	**After device**	**After 1 min**	**After 5 min**	**Immediate before CO2 Insufflation**	**Insufflation of CO2**	**Post extubation**
Heart Rate (BPM)									
Grp P (Mean±SD)	77.50	83.23	84.70	83.90	83.67	78.13	75.30	80.10	88.10
	16.84	14.08	12.15	13.30	13.60	11.19	7.46	13.02	15.25
Grp E (Mean±SD)	78.06	83.46	84.73	91.40	91.37	82.97	79.40	80.47	94.60
	12.09	14.86	10.27	9.67	10.92	12.31	12.13	13.46	7.03
p value	> 0.05	> 0.05	> 0.05	**< 0.05**	**< 0.05**	> 0.05	> 0.05	> 0.05	**< 0.05**
Systolic Blood Pressure(mm of Hg)									
Grp P (Mean±SD)	134.33	127.70	102.56	109.57	107.37	103.03	110.63	116.47	134.57
	21.09	16.24	7.71	14.82	13.95	12.13	7.45	16.60	17.44
Grp E (Mean±SD)	133.73	131.26	106.30	144.13	137.50	127.57	113.67	124.50	144.47
	15.66	14.15	7.41	22.50	20.66	16.54	8.07	15.29	13.92
p value	>0.05	>0.05	>0.05	**<0.05**	**<0.05**	**<0.05**	>0.05	>0.05	**<0.05**
Diastolic Blood Pressure (mm of Hg)									
Grp P (Mean±SD)	77.67	74.43	65.57	67.17	65.43	63.77	62.80	73.53	80.37
	10.04	8.15	9.38	10.53	10.39	9.89	4.96	10.26	9.93
Grp E (Mean±SD)	82.34	78.93	69.43	93.97	86.10	79.27	64.67	78.43	89.40
	9.65	10.64	5.31	16.33	16.08	14.22	3.12	10.43	8.98
p value	>0.05	>0.05	>0.05	**<0.05**	**<0.05**	**<0.05**	>0.05	>0.05	**<0.05**
Mean Arterial Pressure									
Grp P (Mean±SD)	97.20	92.37	77.73	83.70	80.87	78.07	78.56	89.40	100.80
	14.08	08.38	08.10	13.47	11.21	10.12	04.12	12.59	13.72
Grp E (Mean±SD)	100.36	96.40	81.07	110.17	103.90	96.33	80.90	94.93	107.07
	11.80	10.77	04.86	18.95	16.92	13.29	03.39	11.10	12.04
p value	>0.05	>0.05	>0.05	**<0.05**	**<0.05**	**<0.05**	>0.05	>0.05	**<0.05**

Table 5: Oxygenation

Hemodynamic Response	**Baseline**	**After premedication**	**Before insertion**	**After device**	**After 1 min**	**After 5 min**	**Immediate before CO2 Insufflation**	**Insufflation of CO2**	**Post extubation**
Grp P (Mean±SD)	99.33	99.56	99.83	99.90	99.87	99.73	99.80	99.67	99.67
	0.88	0.85	0.53	0.40	0.43	0.69	0.48	0.60	0.72
Grp E (Mean±SD)	99.73	99.90	99.93	99.90	99.87	99.87	100.00	99.80	99.67
	0.69	0.54	0.36	0.54	0.50	0.57	0.90	0.92	0.88
p value	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05

Table 5:Ventilation

Ventilation	**GROUP P**	**GROUP E**
Optimum Ventilation	27	28
Sub Optimal Ventilation	3	2
Failed Ventilation	0	0

Table 6: Morbidity Profile

Morbidity	**GROUP P**		**GROUP E**	
	n	%	n	%
Laryngo-pharyngeal Morbidity (LPM)	08	26.67	11	36.67
Trauma to lip, tongue, oral cavity	07	23.33	08	26.67
Post Operative Nausea & Vomiting (PONV)	05	16.67	12	40.0

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