



# Prospective, Randomized Comparison of Proseal Laryngeal Mask Airway and Endotracheal Tube in Adults Selected for Elective Laparoscopic Abdominal Surgery

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## **Author's contribution**

*The sole author designed, analyzed, interpreted and prepared the manuscript.*

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## **ABSTRACT**

Both PLMA and SLIPA were easy to insert (100% success) and ventilate with maximum sealing pressure of 30cm H<sub>2</sub>O (P = 0.4) with no muscle relaxant. No significant difference (P = 0.265) in intubation time between PLMA and ETT were observed in the study. A significant SpO<sub>2</sub> change (P = 0.804, 0.561, 0.657, 0.248, 0.561) measured Pre op, Pre intubation, 1mt, 3 mt and 5mts after intubation and there were no significant EtCO<sub>2</sub> changes (P = 0.861, 0.251, 0.44) measured after intubation was observed. Blood staining in 1/25 cases with PLMA and 2/25 cases with ETT with a P value of 0.561 was seen.

**Keywords:** PLMA; SLIPA; Blood staining.

## **1. INTRODUCTION**

Laryngeal mask airway (LMA) is a recommended and a better alternate to face

mask. But from the day since it was development the LMA has challenged the assumption that tracheal intubation is the only approved method to maintain a clear

airway and provide positive pressure ventilation [1,2]. To meet the complications of this Proseal laryngeal mask airway (PLMA) in 2000, with some alterations were designed to enable partition of gastro intestinal and respiratory tract, improve airway seal, enable positive pressure ventilation and diagnose mask displacement. A Drain tube (DT) is the other mask which help in diagnosis of mask misplacement, decreases risk of gastric insufflation, regurgitation, and aspiration of gastric contents. With this background this stud was conceptualized to compare Endotracheal tube and Proseal LMA for elective laparoscopic abdominal surgery.

## 2. METHODOLOGY

### 2.1 Study Design

Prospective, Randomized, Comparative single blinded case control study. The study was carried out in Sree Balaji medical college, Chennai from November 2010 to may 2011. The study was conducted in 50 patients in the age group of 18 years and above belonging to ASA I and II Posted for elective laparoscopic abdominal surgery.

The patients who had come for laparoscopic surgery were screened for comorbid illness and difficult airway. Age, Height and Weight were assessed. the patients were randomized in to 2 groups using closed envelope technique as proseal LMA group and endotracheal tube group. Patient was premedicated with Inj. Glycopyrrolate 0.2 µg/kg body weight and Inj. Fentanyl 2 µg/Kg. Pre oxygenated with 100% oxygen at a flow rate of 8L/mt. by using tight fitting facemask for 5 mts. Patient was induced with Inj. Propofol 2 mg/Kg & paralysed with Inj.suxamethonium 2mg/kg. In the Proseal Laryngeal mask airway group, device was inserted and cuff was inflated with 20ml room air. With the PLMA, we filled the proximal 3 cm of the drain tube with the water soluble lubricant jelly. After completion of surgery and adequate neuromuscular recovery patient was reversed with Inj. Neostigmine 50 µg/kg and Inj. Glycopyrrolate 0.4 mg. All data were collected, tabulated and expressed as Mean +/- standard deviation. Appropriate statistical analysis was conducted. All quantitative data were compared using unpaired student's test. All qualitative data were compared using Chi square test. P

values were calculated for all tests. A P values 0 to 0.01 was considered as 1% significant, 0.011 to 0.05 was considered as 5% significant, and >0.05 was considered as not significant.

## 3. RESULTS

PLMA insertion was successfully in 21/25 cases in first attempt while 4 patients 4/25 required second attempt. With ETT all 25 patients were intubated in first attempt. The time taken for PLMA/ETT from introduction into oral cavity to the final confirmation of its proper positioning. Time taken for intubation with PLMA is 37.36 and with ETT is 32.4 (Fig. 1).Gastric distension was assessed by surgeon who was operating. It was Assessed just after peritoneal deflation. Student's 't' test revealed P value of 0.161 which is not significant. This indicates that PLMA provides good airway seal and adequate pulmonary ventilation (Fig. 2).

SPO2 was measured pre operatively, just before intubation, 1mt, 3mt and 5mt after intubation. The actual values are documented in the tabular column (Table 1). there was no significant oxygenation difference between two techniques.

Blood staining in the airway noted after extubation which indicates airway trauma Heart rate, systolic blood pressure Diastolic blood pressure and mean arterial pressure were measured pre operatively, pre intubation , 1 mt, 3mt and 5mts after intubation. The actual values are documented in the tabular column. No significant difference in heart rate between two techniques and Laryngospasm did not occur in both the groups were observed. Hence there was a significant haemodynamic response with ETT when compared to PLMA.

## 4. DISCUSSION

Miller DM, camporota et al in 2006 compared PLMA and SLIPA with ETT in 150 patients. Both PLMA and SLIPA (supra laryngeal airways) were easy to insert (100% success) and ventilate with maximum sealing pressure of 30cm H2o (P = 0.4) with no muscle relaxant.The findings of our study are in concurrence with the above data. Both ETT and PLMA were intubated with ease with P value of 0.312. N.R. Evans, S.V. Gardner et al in 2002 assessed insertion characteristics of

PLMA, airway seal pressure, ease of gastric tube placement in 300 anaesthetised patients. Insertion was successful in 94% of patients and graded as easy in 91 % of patients. Gastric tube placement was successful in 98.6% of patients. In our study 96% of patients (24/25) were graded as PLMA with ease. In our study, we compared PLMA

and ETT in only 50 anaesthetised patients. Sample size is small. Possible reasons for disparity in numbers of attempts for successful placement of masks and small sample size due to lack of experience. I. Roger Maltby, Neil C, Watson et al. [3-10] in 2002, Compared PLMA with ETT in 109 patients undergoing laparoscopic cholecystectomy.

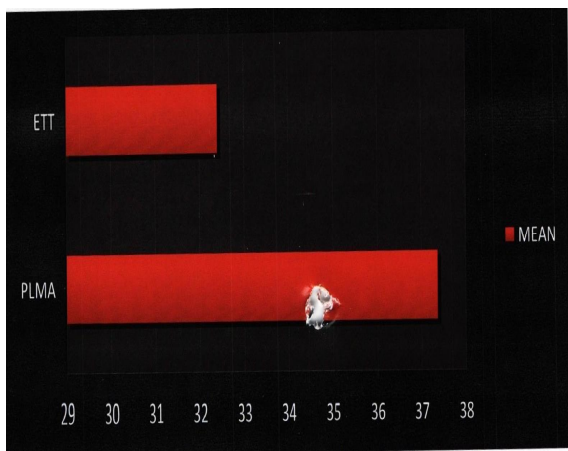


Fig. 1. Time taken for intubation

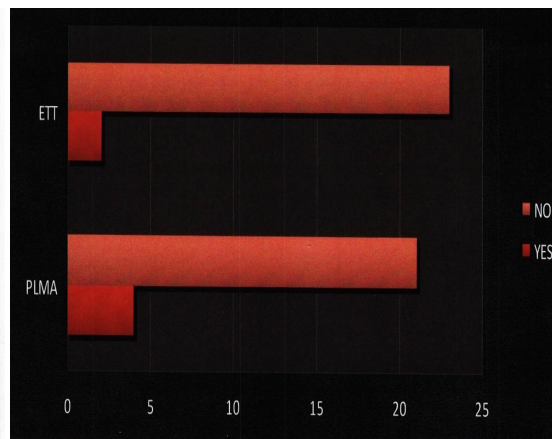


Fig. 2. Gastric Distension

Table 1. SPO2 Changes

	Groups	No	Mean	Standard Deviation	
Pre op	PLMA	25	99.8	0.50	t=2.25 P=0.804
	ETT	25	99.8	0.62	Not significant
Pre intubation	PLMA	25	99.92	0.28	t=0.59 p=0.561
	ETT	25	99.96	0.20	Not significant
Post intubation 1 min	PLMA	25	99.96	0.20	t=0.45 p=0.657
	ETT	25	99.92	0.40	Not significant
Post intubation 3 min	PLMA	25	99.96	0.20	t=1.17 p=0.248
	ETT	25	99.84	0.47	Not significant
Post intubation 5 min	PLMA	25	99.92	0.28	t=0.59 p=0.561
	ETT	25	99.96	0.20	Not significant

Table 2. Systolic blood pressure

	Groups	No	Mean	Standard Deviation	
Pre op	PLMA	25	127.08	12.36	t = 0.30 P =0.766
	ETT	25	126.08	11.2	Not Significant
Pre Intubation	PLMA	25	121.04	12.63	t = 0.85 P =0.401
	ETT	25	124.20	13.72	Not Significant
Post Intubation 1mt	PLMA	25	114.28	18.23	t = 2.30 P =0.026
	ETT	25	127.60	22.50	Significant 5%
Post Intubation 3 mt	PLMA	25	111.06	18.20	t = 3.20 P =0.002
	ETT	25	130.52	24.28	Significant 1%
Post Intubation 5 mt	PLMA	25	103.20	14.73	t = 2.93 P =0.005
	ETT	25	117.68	19.83	Significant 5%

**Table 3. Diastolic blood pressure**

	<b>Group</b>	<b>No</b>	<b>Mean</b>	<b>Standard Deviation</b>	
Pre op	PLMA	25	80.04	8.53	t=1.16
	ETT	25	77.04	9.64	P =0.250
Pre Intubation	PLMA	25	77.6	9.88	Not Significant
	ETT	25	74.08	10.84	t = 1.20
Post Intubation lmt	PLMA	25	71.8	15.97	P =0.236
	ETT	25	81.32	15.44	Not Significant
PostIntubation 3mt	PLMA	25	72.16	16.53	t = 2.14
	ETT	25	83.60	19.68	P =0.037
Post Intubation 5mt	PLMA	25	64.64	15.11	Significant 5%
	ETT	25	75.36	18.61	t = 2.44
					P =0.019
					Significant 5%
					t = 2.24
					P =0.030
					Significant 5%

**Table 4. Mean arterial pressure**

	<b>Group</b>	<b>No</b>	<b>Mean</b>	<b>Standard Deviation</b>	
Pre op	PLMA	25	95.7	8.53	t = 0.94
	ETT	25	93.36	9.11	P =0.352
Pre Intubation	PLMA	25	92.04	9.94	Not Significant
	ETT	25	90.75	11.26	t = 0.43
Post Intubation lmt	PLMA	25	85.94	15.38	P =0.668
	ETT	25	96.72	17.22	Not Significant
PostIntubation3 mt	PLMA	25	85.14	16.45	t = 2.33
	ETT	25	95.62	22.24	P =0.024
Post Intubation 5 mt	PLMA	25	77 "t>	14.23	Significant5%
	ETT	25	89.42	18.54	t = 1.89
					P=0.064
					Significant 5%
					t = 2.56
					P=0.014
					Significant5%

**Table 5. Blood staining in airway**

<b>Group</b>	<b>YES</b>	<b>NO</b>	<b>MEAN</b>	<b>Standard deviation</b>	
PLMA	1	24	1.96	0.2	T=0.59 P=0.561
ETT	2	23	1.92	0.28	Not significant

**5. CONCLUSION**

They concluded that no significant gastric distension in both the groups. This study result is comparable with our study which shows P value

of 0.161. The study done by J. Roger Maltby, Michael T. Beriault on SPO2 changes and their results are in comparable with our study result which shows no significant SpO2 change and hemodynamics as well.

## CONSENT AND ETHICAL APPROVAL

The study was carried out after obtaining Institutional Ethical committee clearance and patient's written informed consent.

## COMPETING INTERESTS

Author has declared that no competing interests exist.

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