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RESEARCH ARTICLE

A COMPARATIVE STUDY OF HEAMODYNAMIC STABILITY AND RESPIRATORY MECHANICS LAPARAOSCOPIC CHOLECYSTECTOMY: PROSEAL LMA VS I-GEL

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ABSTRACT

Background: The recent advent of newer designs in supraglottic airway devices (SAD) provides a possible alternative technique to the traditional use of tracheal tubes during laparoscopic cholecystectomy. Among the supraglottic devices there are possible pros and cons for each device in laparoscopic surgeries. In our study, we compared the haemodynamic and respiratory mechanics of P-LMA and I-Gel in laparoscopic cholecystectomy. ***Objective:*** To compare the haemodynamic stability and respiratory mechanics between I-gel and proseal LMA in laparoscopic surgeries. ***Methods:*** Under optimal induction and muscle relaxation the SAD's were inserted into the patients oral cavity and position was checked with ideal ventilation and chest rise.base line, post induction, after insertion of SAD's, after pneuoperitonium and post operative care respiratory and haemodynamic parameters were recorded and compared. ***Results:*** Mean arterial pressure reading after insertion of SAD'S and dynamic compliance after pneumoperitonium were statistically significant with pvalue>0.05. ***Conclusion:*** It was concluded that i.Gel had better haemdynamic stability and respiratory dynamics than proseal LMA.

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INTRODUCTION

Laparscopic cholesystectomy is commonly performed surgery in which there is drastic changes in respiratory and heamodynamic parameter of the patient under general anaesthesia. The introduction of Supraglottic device have managed to decrease the drastic changes when the patient was intubated with endotracheal tubes. Among the SAD's there are possible pros and cons which in our study we have compared P-LMA and I-Gel to understand them better.

MATERIALS AND METHODS

After getting clearance from the Ethical committee of the institute 60 patients undergoing laparascopic cholecystectomy were selected from august 2016 to december 2018, were divided into 2 groups (Group p and group G) and written consent was taken from each patient.

- Group P : P-LMA
- Group I : I-Gel

All patients received tab. alprazolam 0.25mg PO, Tab. ranitidine150mg, Tab. metaclopramide 10mg on the night before surgery and 2 hrs before the surgery. On the day of surgery patients baseline HR, SBP, DBP, MBP, SPO2 were noted. Patients were premedicated with midazolam 30mcg/kg glycopyrrolate 0.2mg intravenously. Patients were induced with inj.propofol 2mg/kg and fentanyl 1.5mcg/kg, inj.vecuronium 0.1mg/kg.post induction parameters were noted and recorded. After insertion of SAD's haemodynamic parameters plus the respiratory mechanics like dynamic compliance, peak airway pressure and minute ventilation were recorded at 1,3,5 and 10mins . Same above mentioned parameters were measured after creation of pneumoperitonium with carbon-di-oxide .anesthesia was maintained with 33% of oxygen in nitrous oxide, isoflurane and intermittent dose of vecuronium .the tidal volume and respiratory rate was adjusted and intermittent positive pressure ventilation was continued in mechanical ventilator to maintain end tidal carbon di oxide between 35-45 mmhg.pneumo peritoneum was created by filling the peritionium with carbon di oxide in the operation table after insertion of SAD in reverse trendelenberg position . intra abdominal pressure was not allowed to exceed 14mmhg throughout the surgery. The presence of any leak of the SAD was detected by listening to the sounds coming from the mouth due to displacement of SAD's. At the end of the surgery residual neuromuscular block was reversed with appropriate dose if inj. Neostigmine and inj. glycopyrrolate intra venously.

Psot operative complications such as post extubationcough, presence of blood on the SAD, sorethroat, dysphagia, dysphoniaand numbness of the toungue or the oropharynx were identified and recorded.

OBSERVATION AND RESULTS

Demographically there was no significance and was statistically insignificant (p value>0.05) between the 2 groups. There was no significance in the parameters like HR, SBP, DPB, ETCO2, SPO2,Mean airway pressure and minute ventilation (p value>0.05). Now coming to the MAP baseline, post induction and after pneumoperitonium were not statistically significant and comparable between the 2 groups. But the MAP after insertion of SAD'S were statistically significant (p value>0.05) which is shown in Table 1 and Figure 1.

Mean arterial pressure (MAP) measured was significantly higher in group p (P-LMA) after insertion , with a mean of 94.6 , 94.56,94.56 and 95.633 at 1,3,5 and 10 minutes after insertion of SAD respectively and compared to group I with a MAP of 92.06,91.9,91.8 and 92.36 at 1.3.5 and 10 minutes after insertion of I-Gel respectively. In case of dynamic compliance , the reading recorded like the reading after insertion of SAD's and end of surgery were comparable between 2 groups and were statistically insignificant with a p value>0.05. but the reading recorded after formation of pneumo peritoneum were mean of 40.7,32.86,32.9,33.16.33.13 and 33.23 at 5,10,15,30,45 and 60 Minutes respectively in case of Group P, 58.8,58.93,58.93,58.9,58.83 and 58.8 at 5,10,15,30,45 and 60 mins respectively after creation of pneumoperitoniumwiith patient ventilated wih I-Gel. going by the numbers there was significant drop in dynamic compliance.

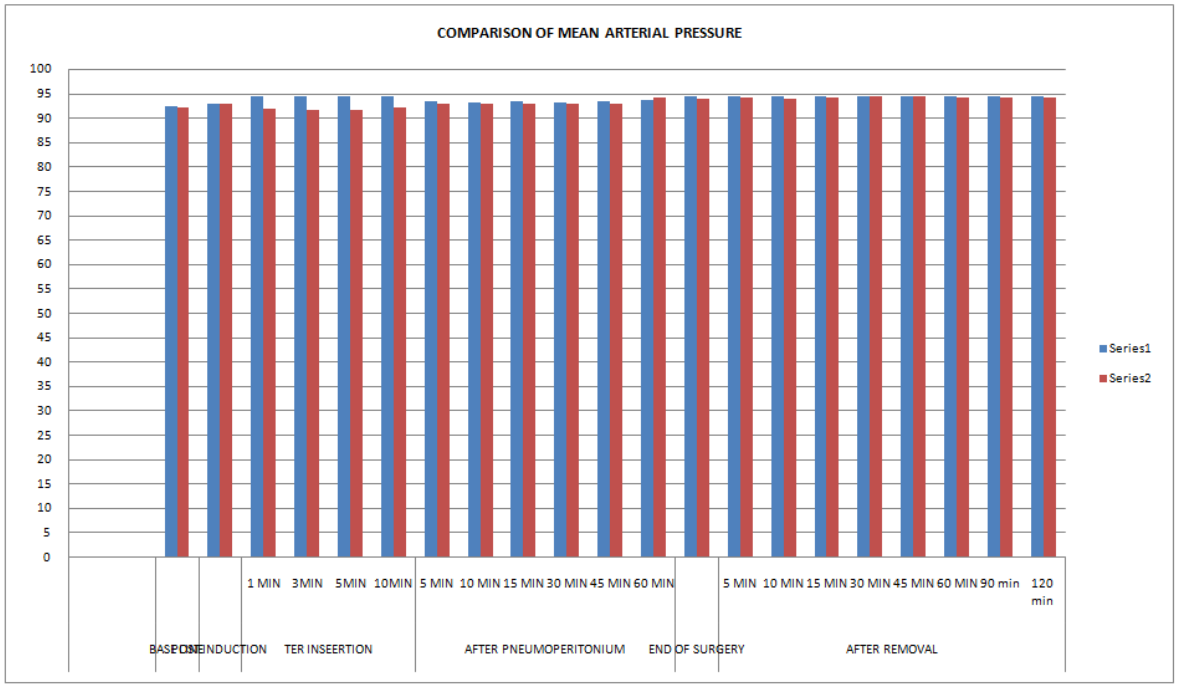

Figure 1. Comparison of mean arterial pressure beween group p and group I

Table 1. Comparisonof mean arterial pressure between group P and group I

		PLMA		PLMA			
		MEAN	SD	MEAN	SD	P VALUE	SIGNIFICANCE
BASE LINE		92.6	3.3	92.4	3.9	>0.05	NS
POST INDUCTION		93.1	3.8	93	3.9	>0.05	NS
TER INSEERTION	1 MIN	94.6	4.6	92	5	<0.05	S
	3MIN	94.5	4.6	91.9	4.9	<0.05	S
	5MIN	94.5	4.6	91.8	5.3	<0.05	S
	10MIN	94.6	3.1	92.3	3.5	<0.05	NS
AFTER PNEUMOPERITONIUM	5 MIN	93.5	3.1	93.1	3.5	>0.05	NS
	10 MIN	93.4	3.1	93.1	3.5	>0.05	NS
	15 MIN	93.5	3.1	93.1	3.7	>0.05	NS
	30 MIN	93.4	3.1	93.1	3.6	>0.05	NS
	45 MIN	93.5	3.1	93.1	3.6	>0.05	NS
	60 MIN	93.8	3.2	94.4	3.5	>0.05	NS
END OF SURGERY		94.6	4.6	94	6.5		
AFTER REMOVAL	5 MIN	94.5	4.7	94.4	4.7	>0.05	NS
	10 MIN	94.5	4.6	94	5.4	>0.05	NS
	15 MIN	94.5	4.7	94.4	4.7	>0.05	NS
	30 MIN	94.6	4.6	94.5	4.7	>0.05	NS
	45 MIN	94.6	4.6	94.5	4.7	>0.05	NS
	60 MIN	94.6	4.6	94.3	4.9	>0.05	NS
	90 min	94.6	4.6	94.3	4.9	>0.05	NS
	120 min	94.6	4.6	94.4	4.8	>0.05	NS

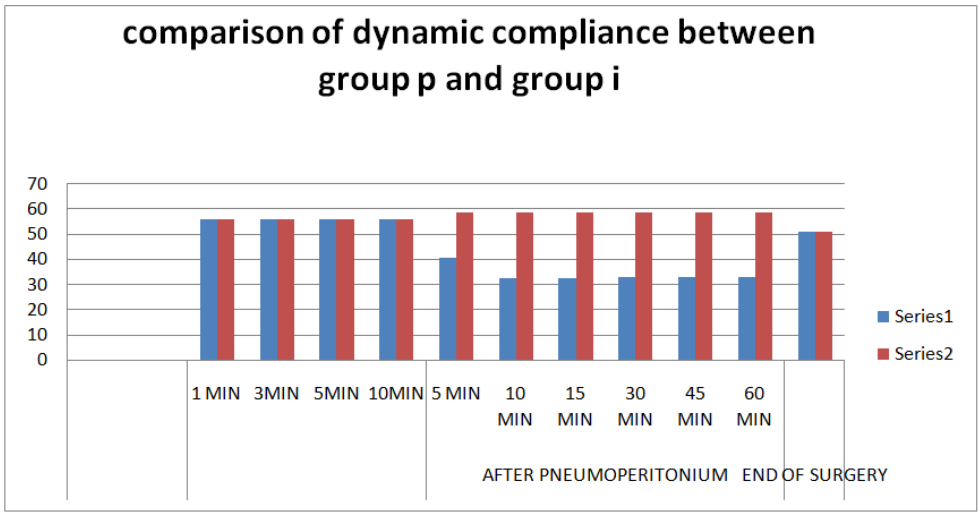

Figure 2. Comparison of dynamic compliance between group P and group I

Table 2. Comparison of dynamic compliance between group P and group I

		GROUP P	GROUP I
		MEAN	MEAN
	1 MIN	56.1	56.1
	3MIN	56.1	56
	5MIN	56.1	56.1
	10MIN	56	56
AFTER PNEUMOPERITONIUM	5 MIN	40.7	58.8
	10 MIN	32.8	58.9
	15 MIN	32.9	58.9
	30 MIN	33.1	58.9
	45 MIN	33.1	58.8
	60 MIN	33.2	58.8
END OF SURGERY		51.3	51.1

DISCUSSION

Till before the invention of the LMA, tracheal intubation was the only source of securing airways in laparoscopic surgeries as well. Due to increased respiratory and haemodynamic instability slowly and steadily LMAs replaced endotracheal tubes where ever not contraindicated. In our studywe compared PLMA and I-Gel in laparoscopic cholecystectomy in 60 patientd who were randomly selected in both groups. Each group having 30 patients were demographically comparable and statisitically insignificant (p value>0.05). After inserting the SAD haemodynamic changes were significant in both groups i.e MAP was significant at 1,3,5, and 10 mins after insertion. Rise in MAP was less with I-Gel group when compared to PLMA, same which was observed by V Trivedi, B Patel *et al*, who concluded that the I-Gel airway is better alternative SAD than PLMA with controlled ventilation and for securing airway in difficult airway management especially in high rsik cardiac patients since it produces lesse hemodynamic changes and easy to insert than PLMA. Parul Jindal *et al* have done a study to evaluate and compare the hemodynamic changes during insertion of SAD LMA, SLIPA or I-Gel. This prospective study was was conducted on 75 patients of either sex, 20-70yrs, ASA I and II scheduled to mundergo elective surgical procedures under general anaesthesia. All 3 supraglottic devices were introduced using standard techniques by a single anaesthesiologist who had considerable experience in all 3 techniques. Number of intubation attempts was similar among all groups but intubation attempt time was significantly longer in LMA (7.68+6.9) while compared to I-Gel (3.48 +1.41) and SLIPA (5.16+0.68). It was observed that I-Gel produced less haemodynamic changes than SLIPA. In our study also I-Gel produced less changes in MAP than PLMA. Laparoscopic surgeries has been shown to adversely affect intra-opertaive pulmonary function, thus providing the most severe test of the efficacy of an airway device. Pulmonary compliance is decreased and the resisitance is increased leading to high airway pressures. Therefore, higher inspiratory pressure are required to provide adequate tidal volume and minute ventilation. Intra abdominal pressure of 15-20mmhg is associated with increase in the peak airway pressure of about 50%, decrease in lung compliance by 25% and an increase in PaCO2 by 10mmhg. Consistent with these rsults, we observed that following carboperitonium, compliance decreased in both groups. Bimlasharma *et al* concluded that compliance was higher with I-Gel. both the devices provided optimal ventilation and oxygenation and the adverse events were also comparable. A preliminary study was conducted for I-Gel airway device by AshishKannaujja *et al* 13. Thisn study was conducted on 50 consecutive patients if ASA physical staus I-II to determine the ease of insertion time to achieve effective airway. Oropharyngeal pressure and airway stability on head and neck movement. The success rate at first attempt was 90% with a median insertion time of 11sec (range 8-45). 5 patients needed 2nd attempt while none. In our study also 90% of the patients airway was secured in 1st attempt in both the groups. Ishwarsingh *et al* studied comparison of clinical performances of I-Gel with LMA proseal in elective surgeries. 60 patients were randomly assigned into 2 groups. Group-I for I-Gel and group P for LMA proseal, the success rate of first attempt of

insertion and ease of gastric tube placement was more with group I. Blood staining of device was more with group P there was no evidence of bronchospasm, laryngospasm, regurgitation, aspiration or hoarseness in either group. This study resembles our study in which 50% of the patients in PLMA group had blood staining and the results of the study were statistically significant (p value<0.05). Different airway devices and methods of airway management each have their advantages and disadvantages, many anaesthesiologist consider tracheal intubation to be the gold standard for airway management for all but short general anaesthesia with spontaneous respiration .however it loses its purpose when limitation such as failed tracheal intubation. The can't intubate, can't ventilate situation , patient refusal of advised awake fiberoptic – assisted intubation, airway problem following extubation and dental damage are considered the advantages of PLMA and I-Gel bypassed all these complications. I-Gel provides better haemodynamic stability in aparoscopic cholecystectomy and can be used safely in cardiac patients. I-Gel maintains the compliance of lung better than PLMA in laparoscopic surgeries.

Conclusion

According to study conducted 60 patients divided into 2 groups, we conclude that adequate pulmonary ventilation can be achieved with Supraglottic airway, Among which I-Gel is having better haemodynamics stability and respiratory mechanics in patients undergoing laparascopic surgeries.

REFERENCES

Asai T, Brimacombe J. 2000. Cuff volume and size selection with the laryngeal mask. *Anaesthesia,* 55:1179–1184.

Brain AIJ, Verghese C, Strube PJ. 2000. The LMA "ProSeal"—a laryngeal mask with an esophageal vent. *Br J Anaesth* 84:650–654.

Brimacombe J, Keller C. 2002. The ProSeal laryngeal mask airway. *Anesth Clin N Amer.,* 20:871–891.

Brimacombe J, Keller C. The ProSeal laryngeal mask airway. 2000. A randomized, crossover study with the standard laryngeal mask airway in paralyzed, anesthetized patients. Anesthesiology., 93:104–109.

Brodrick PM, Webster NR and Num JF. 1989. Use of Laryngeal mask airway in spontaneously breathing patient in variety of surgery. *Anaesthesia.* 72:99-101.

Fuh Cheng Yeh, Chao Te Huang. 2002. Use of LMA in gynaecological laparoscopy, ventilator effect of pnumoperitoneum. *Tzu Chi Med J*., 14:69-72

Jindal P, RizviA, Sharma JP. 2009. Is I-gel a new revolution among supraglottic airway devices. A comparative evaluation. M.E.J. Anaesth., 20(1):53-58.

Kannaujia A, Srivastav U, Saraswat N, *et al*. 2009. A Preliminary study of I-gel: A new supraglottic airway device. *Indian J of Anaesthesia*., 53(1):52-56

Levitan R.M, KinkleW. C. 2002. Initial anatomic investigations of the i-gel airway:a novel supraglottic airway without inflatable cuff. *Anaesthesia,* 60;1022-1026

Sharma B, Bhan M, Sinha A, etal. Arandomised prospective comparative study of P

Singh I, Gupta M, Tandon M. Comparison of clinical performance of I-gel with LMA-Proseal in elective surgeries. *Indian J of Anaesthesia*., 53(3):302-305

Tae-Hyung Han J. 2001. Brimacombe Eun Tu Lee and Long Senk. Using LMA in elective caesarean section. Indian. Anaesth., 58:226-228

Varghese C, Joseph R. 1996. Survey of laryngeal mask airway in 11,910 patients. *Anaesth Analg*., 82:129-133.

Wharton NM, Gibbison B, Gabbott DA, *et al*. 2009. I-gel insertion by novices in manikins and patients. *Anaesthesia.* 63(9):991-995.

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