e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2022; 14(11); 206-209

Original Research Article

A Comparison of the Sealing Pressures and Post-Complication Rates for Adults Having Elective Laparoscopic Cholecystectomy Under General Anesthesia Using I-Gel and Proseal LMA

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Received: 15-09-2022 / Revised: 26-10-2022 / Accepted: 10-11-2022
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Conflict of interest: Nil

Abstract

Background: Laryngeal mask airway (LMA) Proseal has an inflatable cuff while i-gel™ has a noninflatable cuff made of thermoplastic elastomer.

Aims: To compare sealing pressure and post of complication while introducing I-gel and PLMA while conducting Lap-choly under GA.

Subjects and Methods: This study was conducted as randomized observational study in a teaching hospital. Sixty American Society of Anesthesiologists I and II, patients posted for Lapcholycystectomy under general anesthesia were divided in two groups of thirty each. LMA Proseal™ and i-gel™. Sealing pressure and post of simplification were compared between the two.

Results: According to our study we conclude that both I-gel and PLMA are comparable in maintaining a patent airway during controlled ventilation. Both PLMA and I-gel are emerging as an effective alternative for tracheal intubation. We also concluded that airway sealing pressures are found to be significantly higher in PLMA as compared to I-gel thought PLMA provides a better orophrayngeal seal than i-gel in laparoscopic surgeries where the is pneumo-peritoneum and increased intra-abdominal pressures.

Conclusions: We conclude that both the devices can be effectively used in laparoscopic surgeries though their frequent use and safety needs further evaluation.

Keywords: General Anaesthesia, Respiratory distress, Lap Cholycystectomy, I-gel and PLMA.

Introduction

The major responsibility of anaesthesiologist is to provide adequate ventilation to patient. Tracheal intubation is the gold standard method for maintaining a patent airway during anaesthesia. Laparoscopic surgery is an evolving subspecialty of surgery and is not only limited to minor gynaecologic surgery or cholecystectomy but has extended to procedures such as appendicectomy, hernia repairs (inguinal, epigastric and incisional), advanced gastrointestinal, urologic and gynaecologic procedures. The problems common to all such procedures are a) hypercarbia b) raised abdominal pressure and c) potential danger of regurgitation and pulmonary aspiration. The anesthesiologist must ensure a patent airway and adequate ventilation. [1,2,3]

Till date the cuffed tracheal tube was considered as ideal for providing a safe

glottis seal especially for laparoscopic procedures under general anaesthesia. [4] But over a period of time new airway devices have been added to the anesthesiologist's armamentarium. The I-gel airway (intersurgical Ltd, workingham, Berkshire, UK) and ProSeal Laryngeal Mask Airway (PLMA) (The laryngeal mask company st heiler, jersey, UK) are two recently introduced devices for maintaining the airway during controlled ventilation under general anaesthesia. [5,6]

Material and Methods

After approval from hospital ethical committee and written informed consent from patient, this randomized prospective study was performed on 60 ASA Grade I & II patients of either sex (30 patients in each group) admitted in CSS hospital undergoing elective laproscopic cholecystectomy under general anaesthesia.

Inclusion Criteria

- Patients undergoing elective laproscopic cholecystectomy under general anaesthesia
- Surgery time <2 hrs
- Age between18 to 58 years.

Exclusion Criteria

- Patient refusal
- ASA III and IV
- Pre op sore throat
- Inter incisor gap <2cm
- Mp grad III and IV
- Difficult airway
- BMI >30K g/m^2
- Surgery duration> 2 hrs
- Patients with high risk of aspiration (hiatus hernia, GERD and full stomach)
- Pregnancy

Randomization of Patients

Two groups were formed.

GROUP I- I- GEL (Intersurgical ltd. Workingham, Berkshire (uk) used for insertion. (B=30)

GROUP –P- Proseal LMA (intavent venner's medical (Singapore) used for insertion. (N=30). A total of 60 cards (30 in each group) were prepared by another person who was blinded about the study, after recruitment every patient was allowed to draw one card, and grouped accordingly.

Patients were premedicated with IV inj. Glycopyrrolate (0.005mg/kg), inj. Midazolam (0.05mg/kg), inj, fentanyl (2µgm/kg). Anaesthesia was induced with Inj. Propofol 1% (2mg/kg) followed by vecuronium 0.1mg/kg). I-GEL or PLMA was inserted when no response was obtained in train of four stimulation successful placement was confirmed by bilateral chest movement, auscultation and normal EtCo2 tracing and value[11]. In accordance with manufacture manual sizes of I-GEL is dependent on patients weight. Size 3 was used for patients less than 50 kg and size 4 for those between 50 and 90 kg similarly size of PLMA was selected depending on patient's weight. Anaesthesia was maintained with Isoflurane, nitrous oxide and oxygen. The insertion technique includes neck flexion, head extension and then airway device is inserted. Cuff pressure is measured by (pressure manometer VBM Germany) of the PLMA not exceeded more than 60cm of H20. Gastric tube was passed into the stomach and its position was assessed by suction of gastric fluid if needed.

All patients were ventilated with 8-10 ml per kg of tidal volume to maintain end tidal Co_2 within 30-40 mm of Hg.

All procedures were performed by a single experienced investigator.

Statistical analysis

The results obtained in the study were presented in a tabulated manner as mean ± SD and were analyzed using with statistical package for social sciences (SPSS20.0). Categorical variables are expressed as frequencies. Differences between groups were assessed with chi-square or fisher's exact test for categorical variables. Unpaired t tests were used for comparison of continuous variables between the two groups. I-GEL or PLMA insertion characteristics were compared using Mann

Whitney test. 'p' value of <0.05 was considered as statistically significant.

Results

Table 1: Airway Sealing Pressure in both groups.

Airway Sealing Pressure (Cm of H_2O)	Groups				P value
	Group I		Group P		
	N	Mean±SD	N	Mean ±SD	
Just after insertion	27	25.7±0.6	28	29.36±1.6	<0.001*
During Carbo-peritoneum	27	22.30±1.0	28	25.89±1.8	<0.001*

As per table1 the airway sealing pressure in both groups just after insertion was higher in Group 2 and was statistically significant ($p<0.05$). Similarly pressure after carbo-peritoneum is also higher in group 2 which was also significant.

Table 2: Complication between both groups.

Complication	**Groups**	
	Group I	Group P
Hoarseness	0(0%)	1(3.3%)
Sore throat	0(0%)	1(3.3%)

As per table 2 the most common complication in both groups were only hoarseness and sore throat but seen only in group 2 and was statistically significant ($p<0.05$).

Discussion

This randomized prospective study was carried out in Govt. Medical College Datia. Total 60 subjects of either sex (30 patients in each groups) of ASA I & II, of age 15-58 years undergoing laparoscopic cholecystectomy under general anaesthesia with positive pressure ventilation. Patients were split into two groups: P and I (I-gel) (PLMA- Proseal LMA). Age, gender, ASA and MP grades, as well as other demographic characteristics, were compared between the two groups. Both groups had their airway sealing pressure and post-complication results compared. The outcomes of the current clinical research have demonstrated numerous benefits of I-gel. These include a high rate of success on the first try, ease of insertion, and a quicker time to establish an efficient airway. High seal pressure and device stability despite variations in head and neck posture are further benefits. [5,6] I-gel was reportedly easier to install than any other supraglottic device now on the market, according to all anesthetists. The anatomical structure of the non-inflatable object is principally responsible for this increased stability. [7]

Some potential benefits of a supraglottic airway device without an inflatable cuff include easier insertion and a lower possibility of tissue compression. Contrarily, a supraglottic device with an inflated cuff can absorb anesthetic gases; increasing mucosal pressure I-gel may find a place during CPR because of its high rate of success on the first try and short insertion time. [8,9,10] Additionally, during chest compression, simple ventilation of the chest without air leak may be advantageous.

Because the procedure took less time to complete successfully, there were no intraoperative issues like arterial desaturation or hemodynamic abnormalities in any patient. Since this is a novel gadget, there aren't many published studies about it being used during anesthesia. The majority of studies uses cadavers or manikins and is primarily intended to assess how easy it is for non-anesthetists to install medical devices successfully. I-gel has been discovered to be the easiest material to implant in different kinds of manikins [11]. With the use of endoscopies and neck dissections examined the mechanics and location of this device in

65 non-embalmed cadavers. [4] In all 65 cases, a plottic opening score (POGO) of greater than 50% was attained. In a study on cadavers, I-Gel was consistently positioned over laryngeal inlet as confirmed by endoscopy, radiography and dissection [4]. It was also used to facilitate endotracheal intubation [12,13].

Conclusion-

Our work leads us to the conclusion that I-gel and PLMA both preserve a patent airway during regulated breathing. I-gel and PLMA are both developing as successful alternatives to tracheal intubation. We also came to the conclusion that even though PLMA offers a superior orophryngeal seal than I-gel during laparoscopic procedures where there is pneumoperitoneum and elevated intra-abdominal pressures, aitway sealing pressures are discovered to be much higher in PLMA as compared to I-gel. We conclude that both devices can be used successfully in laparoscopic procedures, while further research is needed to assess their frequent use and safety.

Source of Funding- None

References

1. I gel instruction mannual. 2016.
2. Keller C, Brimacombe J, Keller K, Morris R. Acomparison of four methods for assessing airway sealing pressure with the laryngeal mask airway in adult patients. Br J Anaesth. 2019;82:286–287.
3. Brimacombe JR, et al. A comparison of laryngeal mask airway and cuffed oropharyngeal airway in anaesthetized adult patients. Anesth Analg. 2018;87: 147–52.
4. Levitan RM, Kinkle WC. Initial anatomic investigation of the I-gel airway: a novel supraglottic airway without inflatable cuff. Anaesthesia. 2015; 60:1022–6.
5. Twing S, Brown JM, Williams R. Swelling and cyanosis of the tongue associated with use of a laryngeal mask airway. Anaesthesia and Intensive Care. 2009;28:449–506.
6. Stewat A, Lindsay WA. Bilateral hypoglossal nerve injury following the use of laryngeal mask airway. Anaesthesia. 2012; 57:264–5.
7. Lowinger D, Benjamin B, Gadd L. Recurrent laryngeal nerve injury caused by a laryngeal mask airway. Anaesthesia and Intensive Care. 2019;27:202–5
8. Ouellete R G. The effect of nitrous oxide on laryngeal mask cuff pressure. American Association of Nurse Anesthetist Journal. 2020;68:41 1–414.
9. Soar J. The I-gel supraglottic airway and resuscitation – some initial thoughts. J Resuscitation. 2017;02:01211.
10. Gabbot D, Beringer R. The I-gel supraglottic airway: A potential role for resuscitation? Resuscitation. 2017;73:16 1–164.
11. Jackson KM, Cook TM. Evaluation of four airway training manikins as patient simulators for the insertion of eight types of supraglottic airway devices. Anaesthesia. 2017; 62:388–393.
12. Sharma S, Rogers R, Popat M. The I-gel airway for ventilation and rescue intubation. Anaesthesia. 2019;62:419–420.
13. I. F., TM. B., S. D., OA. T., AM. K., B. S., F, C., L. T., & J. T. Eye health status and cause of visual impairment in survivors of Ebola virus disease in the Republic of Guinea: Etat de santé oculaire et cause de déficiences visuelles chez les survivants de la maladie à virus Ebola en République de Guinée. Journal of Medical Research and Health Sciences. 2022; 5(10): 2317–2323.