

A Study on Complications of I - Gel Versus Cuffed Tracheal Tube in Elective Laparoscopic Cholecystectomy

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Abstract

Introduction: In spite of tremendous advances in contemporary anesthesia practice, airway management continues to be of paramount importance to anesthesiologist. **Methodology:** 60 patients of ASA 1 and 2 with BMI <35kg/m², between 18 and 60 yrs. were enrolled into the study. They were randomized into two groups of equal number using the chit-in-a-box method for the use of either i-gel or endotracheal tube for the maintenance of airway during the anesthesia. Both groups were comparable with respect to age, sex, BMI, ASA grading, airway characteristics and anesthesia technique used was same in both groups. **Results:** No gastric distension, regurgitation, aspiration, laryngospasm or bronchospasm seen while using the i-gel or endotracheal tube during our study. 4 cases reported of having hoarseness of voice and 2 cases reported of having sore throat in endotracheal group but there were no cases of sore throat or hoarseness of voice in i-gel group, which are well known advantages of laryngeal mask air way. **Conclusion:** Our study supports the use of i-gel during VCV in elective laparoscopic cholecystectomy using low to moderate tidal volumes provided that peak

airway pressure is not more than device leak pressure.

Keywords: I-Gel; Leak Fraction; Pneumoperitoneum; Cholecystectomy; Complications.

Introduction

Different supra-glottic devices are being used since last many years for maintaining airway and positive pressure ventilation during general anesthesia. Laryngeal mask airway and perilaryngeal airway (cobra tube) are among them and "I gel" is new addition to these devices. The I-gel is made of soft thermoplastic elastomer, gel like and transparent as well. It doesn't have an inflatable cuff but effectively covers the perilaryngeal area for ventilation. Different studies have shown that its insertion is easier and faster than conventional laryngeal mask airways [1,2].

Studies on Cadaver showed that i-gels effectively conformed to the perilaryngeal anatomy and consistently achieved proper positioning for supraglottic ventilation [3]. Manikins studies and patients have shown that the insertion of the i-gel was significantly easier when compared with insertion of other SADs [4,5]. Few studies had been done to evaluate the use of i-gel during controlled ventilation but they did not evaluate its use during procedures with airway pressure more than 25 cm H₂O [6].

This study aims to test and compare cuffed endotracheal tube and i-gel in terms of their: Incidence of intra-operative and post-operative complications.

Methodology

60 patients satisfying the above criteria were enrolled into the study. They were randomized into two groups of equal number using the chit-in-a-box method for the use of either i-gel or endotracheal tube for the maintenance of airway during the anesthesia. All patients were pre-medicated with oral Ranitidine 150 mg, Metoclopramide 10 mg and Alprazolam 0.5mg the night before surgery and with oral Ranitidine 150mg and Metoclopramide 10mg two hour prior to the induction of anesthesia.

We used Datex-Ohmeda; Aestiva 5 anesthesia machine with standard monitor. Anesthesia protocol was made the same for all patients.

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Preoxygenation then induction of anesthesia was done by propofol 1.5 to 2 mg kg⁻¹, fentanyl 2 mcg kg⁻¹ and neuromuscular relaxation achieved by atracurium 0.5 mg kg⁻¹ with increments of 5 mg boluses every 30 min. Anesthesia was maintained by oxygen, nitrous oxide, isoflurane mixture. In i-gel group, Size 3 i-gel used in all female patients and size 4 is used in male patients. Proper preparation, lubrication with water soluble lubricant was done. Senior anesthetist inserted the i-gel as recommended by the manufacturer. In endotracheal group the trachea of the participant was intubated with an appropriate size tracheal tube: size 8.5 was used for the male participants and size 7.5 was used for the female participants.

Inclusion Criteria

1. Patients between 18 and 60 years of age.
2. ASA status of either I or II
3. BMI below 35 kg/m²

Exclusion Criteria

1. Patients with a known or predicted difficult airway.
2. Patients at increased risk for aspiration.
3. Patients with an active respiratory tract infections or a reactive airway.

4. Patients with any pathology of the neck or cervical spine.
5. Edentulous patients.

After induction of anesthesia by a suitable intravenous induction agent and after achieving adequate anesthetic depth, the randomly chosen, appropriately sized airway device was inserted and connected to the breathing circuit. The following parameters were then studied:

Intraoperative complications: such as airway Loss, laryngospasm and coughing

Postoperative complications: Blood on the device, laryngospasm, coughing, sore throat, hoarseness of voice.

The data was analysed using the Statistical Package for Social Sciences software for Windows.

Results

Age, height, weight, BMI and ASA status were comparable in both groups. There were no incidents of gastric distension, bronchospasm, laryngospasm, gastric regurgitation, in both groups.

Blood staining is noted in one case of i-gel and oral trauma is noted in two cases, but this was not found to be significant statistically as shown below.

Table 1: Comparison of sex based on group

Sex	I gel		Endotracheal tube	
	Number	Percent	Number	Percent
Male	13	43.3	14	46.7
Female	17	56.7	16	53.3

$\chi^2 = 0.07$, $p = 0.795$ (significant if $p < 0.05$)

Table 2: Comparison of blood staining of air way device based on group

Blood Staining of air way device	I - gel		Endotracheal tube	
	Number	Percent	Number	Percent
Yes	1	3.3	0	0.0
No	29	96.7	30	100.0

$p = 0.500$ (Fisher Exact test) (significant if $p < 0.05$)

Distribution According to Blood Staining of Airway Device

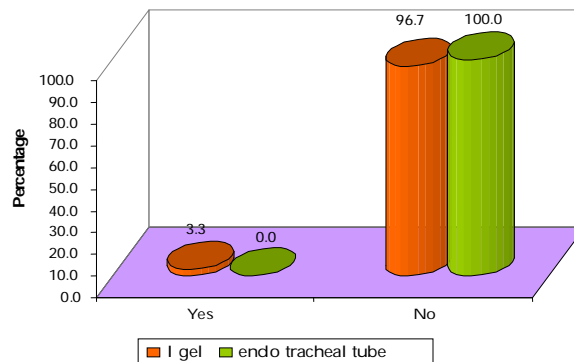
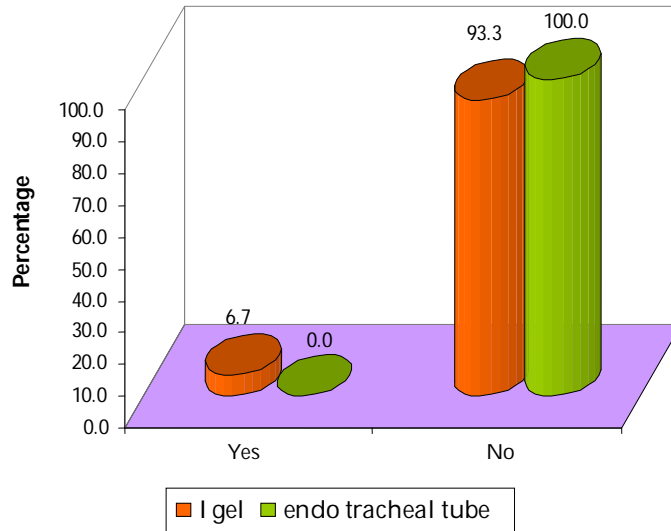


Table 3: Comparison of oral trauma based on group

Oral Trauma	I gel		Endotracheal tube	
	Number	Percent	Number	Percent
Yes	2	6.7	0	0.0
No	28	93.3	30	100.0

p = 0.246 (Fisher Exact test) (significant if p < 0.05)

Distribution According to Oral Trauma



Hoarseness of voice and sore throat noted post operatively in endotracheal group in 4 and 2 cases respectively, but no such complications were noted in I gel group. And this was not found to be significant statistically as shown below

Table 4: Comparison of hoarseness of voice based on group

Hoarseness of voice	I-gel		Endotracheal tube	
	Number	Percent	Number	Percent
Yes	0	0.0	4	13.3
No	30	100.0	26	86.7

p = 0.056 (Fisher Exact test) (significant if p < 0.05)

Distribution According to Hoarseness of Voice

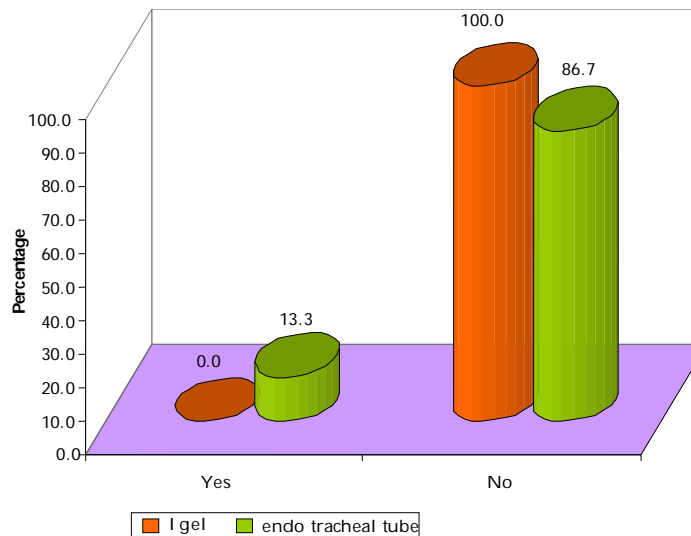
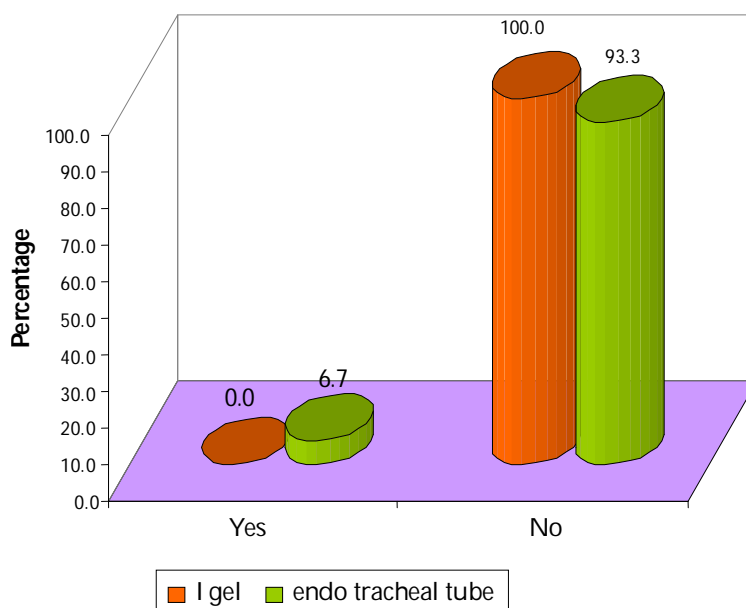


Table 5: Comparison of sore throat based on group

Sore throat	I gel		Endotracheal tube	
	Number	Percent	Number	Percent
Yes	0	0.0	2	6.7
No	30	100.0	28	93.3

p = 0.246 (Fisher Exact test) (significant if p < 0.05)

Distribution According to Sore Throat



Discussion

No gastric distension, regurgitation, aspiration, laryngospasm or broncho spasm, while using the i-gel or endotracheal tube for VCV during our study. There were no cases of failed insertions. Visible blood was observed on the i-gel after removal in our study was 3.3% (1/30). This is similar to those reported with other SAD. The occurrence of visible blood with the use of other SAD has been reported from 12% to 18%, depending upon the type of SAD, technique of insertion, and ease of insertion [7,8].

4 cases reported of having hoarseness of voice and 2 cases reported of having sore throat in endotracheal group but there were no cases of sore throat or hoarseness of voice in I gel group, which are well known advantages of laryngeal mask air way.

There are some limitations of the present study. Firstly, we studied only low risk patients (ASA I and II) who had normal airways and were mostly not obese. Secondly, we included only elective cases and excluded the patients having risk of gastric aspiration.

In our study we found that i-gel airway can be used safely and effectively during volume controlled

ventilation with low and moderate tidal volumes. Our study supports the use of i-gel during VCV in elective laparoscopic cholecystectomy using low to moderate tidal volumes provided that peak airway pressure not more than device leak pressure. Although leak volume was significant, ventilation and oxygenation were optimal in most cases. Tracheal tube should be inserted if failed ventilation and oxygenation. Gastric tube insertion with I-gel helps in preventing gastric insufflation and decreasing air leak and regurgitation.

Conclusions

Gastric tube insertion with I-gel helps in preventing gastric insufflation and decreasing air leak and regurgitation.

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