

Original Research Article

Comparing the functional analysis of I-gel with Baska mask in laparoscopic surgeries: an observational study

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ABSTRACT

Background: More than 40% of general anaesthetics are managed with supraglottic airway devices. First generation SADs act as airway conduits whereas second generation devices have safety designs like integrated bite block, gastric drainage channel and act as airway conduit for endotracheal intubation. Supraglottic airway devices are getting accepted by many anaesthetists during laparoscopic surgeries.

Methods: Authors did a study, comparing the functional analysis of I-gel with Baska mask during laparoscopic surgeries with controlled ventilation. The study was conducted on sixty patients of either sex scheduled for short duration laparoscopic surgeries (<2 hs). The study conducted on ASA I and II patients with a BMI of <30kg/m². Patients with restricted mouth opening(<2.5cm), difficult airway, known GERD patients, obese patients (>30kg/m²), and ASA physical status III and IV patients were excluded from the study. patients were induced with fentanyl 2µg/kg, propofol 2-2.5mg/kg and neuromuscular paralysis facilitated with atracurium 0.5mg/kg. Anaesthesia was maintained with oxygen, air (fio₂ 40%) with isoflurane 1.5-2%. Ease of insertion was evaluated using 4-points scale. Score 1 means easy insertion to score 4 denotes impossible to insert. Oropharyngeal seal pressure was measured after five minutes of placement. FGF 5L/min was used after closing the APL valve at 70cm h₂o, recording the pressure at which pressure is plateaued. Presence of sore throat, dysphagia and dysphonia were examined 2hrs and 24hrs post operatively.

Results: The insertion time was shorter for I-gel (12.3±3.8secs) than Baska mask (20.1±8.1secs). Oropharyngeal leak pressure was significantly higher for Baska mask (24-32cmh₂o). Oropharyngeal airway morbidity was not significantly different between two groups. So, it has been decided that both airways are suitable for laparoscopic surgeries, but I-gel was quicker to insert, but Baska mask gave good airway seal.

Conclusions: In this study, authors have noticed that Baska mask will give good airway seal when compared with I-gel. But I-gel was quicker to insert than Baskamask. The main problem of the study was that it was not blinded.

Keywords: Baska mask, Dysphonia, I-gel, Supraglottic airway devices, Sore throat

INTRODUCTION

Supraglottic airways are meant to provide clear airway in a quicker manner. They ventilate patients by delivering gases above the level of vocal cords and are designed to overcome the disadvantages of endotracheal intubation

like soft tissue injury, exaggerated haemodynamic response and barotrauma. The advantages of supraglottic airway devices include less invasive, avoidance of laryngoscopy, ease of placement, hands free airway, improved haemodynamic stability and less airway related morbidity. More than 40% of general anaesthetics are managed with supraglottic airway devices. First

generation SADs act as airway conduits whereas second generation devices have safety designs like integrated bite block, gastric drainage channel and act as airway conduit for endotracheal intubation.¹ They are also being used in whom mask ventilation or tracheal intubation is impossible. Some of the cuffless devices like I-gel and Baska mask may reduce the risk of laryngopharyngeal trauma. First generation SADs develop air leak during ppv of 16-20 cmh₂o. But second-generation devices maintain seal pressure at 25-28 cmh₂o, which has permitted its use during complex surgeries including laparoscopic surgery, in which intra abdominal pressure is high. There are over 2500 articles and some more than 200 million uses of supraglottic airway devices.² More recently, changes in surgical environment like shorter length of hospital stay, minimally invasive surgery and increased cost have all had some impact on the choice of airway management. SADs made of a soft compliant material may less likely to form channels that may predispose to aspiration than those made of more rigid material. Nowadays anesthesiologists started using supraglottic airway devices for variety of surgeries like general surgical, paediatric, and gynecological surgeries. The main fear of using supraglottic airway devices is aspiration. But after the introduction of airway devices with drainage system, we can overcome many of the problems associated with its use.³ During laparoscopic surgery, authors have to put the patient in different positions to optimize the surgical approach. In this study we compare I-gel (Intersurgical, Wokingham, UK) with Baska mask (NSW, 2264, Australia). Here we compare the ease of insertion, number of attempts, oropharyngeal seal pressure, and post operative complications like sore throat, dysphonia and presence of blood in the device.

METHODS

After getting approval from the ethical committee, the study was conducted on sixty patients who have come for variety of laparoscopic surgeries. Patients of both sex with age ranging from 20- 60 years, ASA physical status I and II, were included in the study. Written informed consent was obtained from all patients. Patients with restricted mouth opening (<2.5cm), difficult airway, known GERD patients, obese patients (>30kg/m²), and ASA physical status III and IV patients were excluded from the study. Inside the O. T, after starting intravenous line, all patients monitored using routine parameters like PR, NIBP, ECG, SPO₂, ETCO₂. Preoxygenation was done with 100% oxygen for three minutes. Patients were induced with fentanyl 2µg/kg, propofol 2-2.5mg/kg and neuromuscular paralysis facilitated with atracurium 0.5mg/kg. After 3-5 minutes, adequate muscle relaxation was confirmed with full jaw movement. Baska mask and I-gel mask were kept ready with thorough lubrication. The patients head was placed in the routine sniffing position. The size of the mask was selected according to the body weight as recommended by the manufacturer.

1. I-gel (Intersurgical, Wokingham, UK); size 3; 30-60kg.size 4; 50-90kg.
2. Baska mask; size 3; (green color for large female or small man); size 4 (yellow, average adult man).

After establishing adequate depth of anaesthesia, well lubricated supraglottic airway device was pushed against the hard palate till we get a definite resistance. All the devices were placed by an experienced anaesthetist with atleast 15 placements previously. Adequate placement and ventilation were determined by auscultation of breath sounds, chest wall movement, and square wave capnography. Anaesthesia was maintained with oxygen, air (fio₂ 40%) with isoflurane 1.5-2%. Repeated doses of atracurium were given according to the need. Ventilator parameters are set with a tidal volume of 6-8ml/kg, respiratory rate 12-16/min to obtain an end tidal co₂ of 40-45mmhg. Any difficulty during insertion was overcome with gentle jaw thrust to facilitate adequate placement. Maximum two attempts were permitted for correct placement. After two attempts, it was treated as failure and managed with endotracheal intubation. After successful placement, a well lubricated 12 F ryle's tube inserted in to the drainage channel to facilitate gastric drainage. At the end of surgery, patients were reversed with neostigmine 2mg and glycopyrrolate 0.4mg. Supraglottic airways were removed after the patients regained consciousness and respond to oral commands. Devices were examined for presence of blood after their removal. Postoperative pain was managed according to the protocol. Ease of insertion was evaluated using 4-points scale. Score 1 means easy insertion to score 4 denotes impossible to insert. Oropharyngeal seal pressure was measured after five minutes of placement. FGF 5L/min was used after closing the APL valve at 70cm h₂o, recording the pressure at which pressure is plateaued. Presence of sore throat, dysphagia and dysphonia were examined 2hrs and 24 hrs post operatively.

RESULTS

All the results were statistically analysed. Statistical significance was defined as P <0.05. Both the groups were comparable about age, sex distribution, duration of surgery (Table 1) and types of surgery (Table 2).

Table 1: Patient characteristics.

Parameter	I-gel (n=30)	Baska mask (n=30)	p-value
Age in years	20-58	18-60	0.57
Sex(male/female)	18/12	13/17	0.52
Duration of surgery (in mins)	40±20.2	28±22.10	0.22

There were no significant differences in number of attempts required for SAD placement in both the groups. However, the insertion time was significantly shorter in i-gel group (Table 3).

Table 2: Types of surgery.

Types of surgery	I-gel (n=30)	Baska mask (n=30)
1.Laparoscopic cholecystectomy	6(20%)	8(26%)
2.Laparoscopic tubal ligation	11(43%)	12(56%)
3.Diagnostic laparoscopy	5(10%)	6(20%)
4.TEPP	8(23%)	4(30%)

Table 3: Device characteristics.

	I-gel (n=30)	Baska mask (n=30)	p-value
1.Insertion time in seconds	8-22 secs	12-31secs	0.124
Mean±SD	12.3±3.8	20.1±8.1	
2.Oropharyngeal leak pressure	18-26cmh ₂ o	24-32cmh ₂ o	0.0008
Mean±SD	22±4.1	26±5.8	

Oropharyngeal seal pressure ranged from 20-28 cmh₂o and 17-32cmh₂o for I-gel and Baska mask groups respectively. Excessive leak during surgery with baska mask necessitates its removal in one patient. Blood staining on the device was found in 2 cases of Baska mask and 3 cases of I-gel while removal. Laryngopharyngeal morbidity was observed during 2 hours and 24 hours after the removal of the device. In the I-gel group 4 patients developed sore throat 2 hours after the removal of the device and one case after 24 hours, in comparison to only one case of Baska mask. Only one patient complained of dysphonia in I-gel group and no case in Baska mask group (Table 4).

Table 4: Complications.

	I-gel (n=30)	Baska mask (n=30)
1.Blood staining on the devices	3(30%)	2(6.6%)
2.Sore throat		
2 hrs post op	4(13%)	1(3%)
24 hrs post op	1(3%)	1(3%)
3.Dysphonia	1(3%)	0%

DISCUSSION

The technique of choice for general anaesthesia during laparoscopic surgeries is endotracheal intubation. Many anaesthetists started using supraglottic airway devices for laparoscopic surgeries. During lap surgeries the intra abdominal pressure is increased to facilitate surgical access. It demands good airway seal to facilitate ventilation and prevent aspiration.

Alexiev et al, in their study showed that Baska mask proved to be difficult to insert than the classical laryngeal

mask.⁴ In this study Baska mask took more time to insert than the I-gel device. First time success rate was highest with I-gel than with the Baska mask. The sealing pressure was higher with Baska mask than with I-gel. Sharifaali et al, demonstrated the better sealing pressure of Baska mask in comparison with pro seal LMA.⁵ Sharma et al in their study comparing pro seal LMA with I-gel, found that the dynamic compliance was higher with the latter. They concluded that the initial oropharyngeal leak pressure obtained by I-gel were lower than pro-seal LMA and LMA supreme, but increased oropharyngeal leak pressure over time, ease of placement and lower airway morbidity are favourable for I-gel. Goyal et al, did not find sore throat and hoarseness even though blood contamination of all SADs. Tom van zundert et al, showed high success rate (92%) and oropharyngeal leak pressure above 30cmh₂o of all patients with I-gel.⁶ Lai et al, during their study with I-gel in laparoscopic surgeries, noticed that there were no differences in the leak fraction between I-gel and ETTgroups.⁷ In the I-gel group less leakage was observed in the trendelenburg than in the supine position. The rate of sore throat was also significantly lower in the I-gel group. Badheka noticed that the time required for I-gel insertion was significantly less when compared with ETT.^{8,9} Shi YB et al, noticed that the insertion time, sealing pressure and incidence of sore throat was lower with I-gel than with pro seal LMA and LMA supreme.¹⁰ Abdel aziz et al, found that the insertion time was significantly shorter in the I-gel group, but oropharyngeal seal was better with Baskamask.¹¹

CONCLUSION

Better safety and efficacy are the important factors which determine the use of SADs in laparoscopic surgeries. Success of supraglottic airways in laparoscopic surgeries depends on the selection of right patients, optimal pneumoperitoneum and avoidance of extreme head low positions. In this study, both airways are comparable in securing airway, but I-gel was quicker to insert than Baskamask. authors have noticed that Baska mask will give good airway seal when compared with I-gel. The main problem of the study, it was not blinded.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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