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Postoperative Sore Throat, Hoarseness and Cough Following Use of Two Different Supraglottic Airway Devices: A Comparison of Baska Mask versus I-Gel

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Abstract

Background: Use of supraglottic devices reduces incidence and severity of postoperative sore throat (POST), cough (POC) and hoarseness of voice (POHV) as compared to endotracheal intubation. We aimed to compare incidence and severity of POST, POC and POHV following use of Baska mask versus I-Gel.

Methods: Prospective, observational study conducted in forty patients undergoing elective surgery requiring general anesthesia. All patients received a generalized anesthesia protocol. After induction in patients of Group BM Baska mask was used whereas I gel was used in Group IG to provide general anesthesia. At end of surgery following a gentle oro-pharyngeal suctioning patients were extubated. Those with grade III sore throat were managed with dispersible Aspirin 75mg gargle.

Pearson's chi-square test or Fisher's Exact test and Independent sample t-test were used as applicable for statistical analysis.

Results: Time taken for securing airway and number of attempts taken were significantly more in Group BM as compared to Group IG. But incidence of trauma did not show any statistically significant difference. Twenty percentages of patients in both groups had POST at 2 hours postoperatively. The incidence showed a downward trend up to 12hours. At 24 hours no patient in both groups had POST. Incidence and severity of POST, POC and POHV were comparable in both groups at all-time points.

Conclusion: Incidence and severity of POST, POC and POHV following use of I Gel and Baska mask did not show any significant difference despite I Gel insertions being faster with fewer attempts for proper placement.

Keywords: Postoperative; Sore throat; Cough; Hoarseness; Anesthesia

Abbreviations: POST: Postoperative Sore Throat; POC: Postoperative Cough; POHV: Postoperative Hoarseness of Voice; ASA: American Society of Anaesthesiologists; SPSS: Statistical Package for Social Sciences; SD: Standard Deviation.

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Introduction

Postoperative sore throat continues to be a taunting problem following general anesthesia with endotracheal intubation. Following minor surgeries such as in day care surgeries, it may result in delays in discharging the patients. Various factors have been implicated and it has been noted that use of supraglottic devices reduced incidence and severity of postoperative sore throat, cough and hoarseness of voice as compared to endotracheal intubation [1-3].

The primary objective of the present study was to compare incidence and severity of postoperative sore throat following use of Baska mask versus I Gel in surgical patients under general anesthesia. Secondary objectives included comparison of the postoperative cough and hoarseness of voice with use of both the devices.

Methodology

It was a prospective, open label, observational study. After obtaining Institutional Ethical Committee clearance and informed consent from all the patients prior to the procedure the study was conducted in forty patients with twenty in each group. Patients undergoing elective surgery requiring general anesthesia, belonging to American Society of Anesthesiologists physical status I and II, aged between 20 and 40 years were recruited into the study. Patients with recent upper respiratory tract infection, full stomach, obese patients, hiatus hernia and pregnancy were excluded from study.

All patients were divided into 2 groups. All patients were kept fasting for solid food for 6 hours and clear fluids for 2 hours before surgery. After shifting patient to the operating room, pulse-oximeter, noninvasive blood pressure monitor and electrocardiogram, were attached. General anesthesia was induced after premedicating patients with fentanyl 2 mcg/ kg and midazolam 2mg intravenously. Propofol 1.5-2 mg/kg,till there was loss of response to verbal commands, was used for induction. Based upon the two groups, supraglottic airway either I-Gel or Baska mask was used. In patients of Group BM Baska mask was used whereas I gel was used in Group IG to provide general anesthesia.

All devices were placed by the anesthesiologists with minimum three years of experience. Number of attempts at proper placement of the supraglottic airway device was noted. An additional attempt was counted when the device was removed from the oral cavity fully to be reinserted again. No more than three attempts were permitted for each device. Maneuvering during placement was not considered as an attempt. Maneuvering such as jaw thrust and external laryngeal manipulations were permitted to ensure adequate positioning of device. Appearance of regular capnography wave form with satisfactory ventilation was considered as adequate supraglottic airway placement. After satisfactory placement of supraglottic device the number of attempts at insertion was noted. Trauma while inserting the device was noted in both groups as evidenced by presence of blood on device while removing at the end of surgery. Following failure to place the supraglottic device in three attempts, those patients were intubated and were excluded from the study.

Anesthesia was maintained using oxygen nitrous oxide 1:1 mixture with end tidal isoflurane at 1 MAC and patients were kept breathing spontaneously. Supplemental analgesia was given with paracetamol 1gm intravenously half an hour after induction. Tachycardia and/or hypertension, i.e. more than 20% increase from the baseline values, was initially treated with increasing isoflurane to 1.5-2% and thereafter with intravenous fentanyl 20μg as boluses.

At the end of surgery ondansetron 4mg was given intravenously and following a gentle oro-pharyngeal suctioning under vision patients were extubated once awake with return of protective airway reflexes. Postoperative analgesia was provided with intravenous paracetamol 1gm 8 hourly and tramadol 100mg on demand.

Postoperative sore throat, cough and hoarseness of voice were assessed at 2, 6, 12 and 24 h based on the scales described in Table 1 [4]. Those with grade III sore throat were managed with dispersible Aspirin 75mg gargle which was repeated as many times as needed till there was relief from the symptoms.

Pearson's chi-square test or Fisher's Exact test was used to compare the categorical variables like gender, ASA status, number of attempts at insertion of the supraglottic device, incidence and severity of postoperative sore throat, hoarseness of voice and cough. Independent sample t-test was used to compare the continuous variables like age and weight among the groups. Statistical analyses were done using SPSS Version 20.0 for Windows (IBM Corporation ARMONK, NY, USA).

Postoperative sore throat	
Severity	**Grade**
No sore throat at any time since the operation	0
Minimal – Patient answered in the affirmative when asked about sore throat	1
Moderate – Patient complained of sore throat on his/her own	2
Severe – Patient is in obvious distress	3
Postoperative cough	
No cough at any time since the operation	0
Minimal	1
Moderate	2
Severe	3
Postoperative hoarseness of voice	
No complaint of hoarseness at any time since the operation	0
Minimal – Minimal change in quality of speech. Patient answers in the affirmative only when enquired about	1
Moderate – Moderate change in quality of speech, of which the patient complains on his/her own	2
Severe – Gross change in the quality of voice perceived by the observer	3

Table 1: Assessment of postoperative sore throat, cough and hoarseness of voice.

Results

The distribution of demographic parameters and ASA physical status were comparable in both groups (Table 2). Time taken for securing airway and the number of attempts taken were significantly more in Group BM as compared to Group IG. But incidence of trauma did not show any statistically significant difference (Table 3). Twenty percentage of patients in both groups had POST at 2 hours postoperatively. The incidence showed a downward trend up to 12hours. At 24 hours no patient in both groups had POST. Incidence and severity of POST were comparable in both groups at all-time points (Figure 1).

Variable	Group BM		Group IG		P value
	Mean	SD	Mean	SD	
Age in years	37.54	9.92	36.78	8.36	0.764
Weight in kg	62.64	10.86	60.31	9.86	0.396
	n	%	n	%	
Gender Male	9	45	10	50	
Female	11	55	10	50	1.000
ASA1	13	65	10	50	0.522
ASA2	7	35	10	50	

Table 2: Comparison of demographics and ASA physical status.

Variable	Group BM		Group IG		P value
	Mean	SD	Mean	SD	
Time taken to secure airway in seconds	101.87 n	26.10%	30.4 n	26.17%	<0.001
Number of attempts One	14	70	18	90	0.048
Two or more	6	30	2	10	
Trauma (No)	16	80	20	100	
Yes	4	20	0	0	0.106

Table 3: Comparison of attempts at securing airway, time taken and associated trauma.

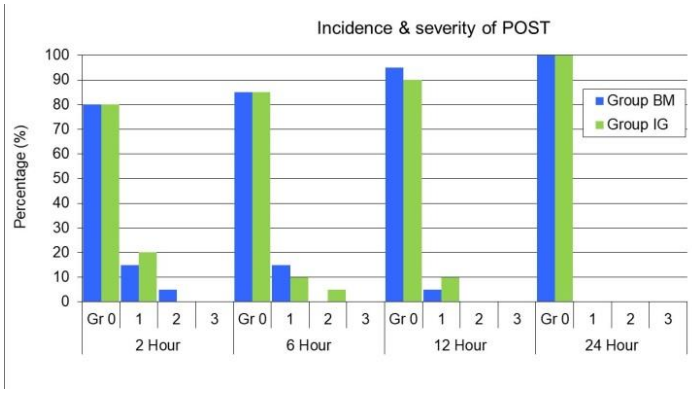

Figure 1: Incidence and severity of postoperative sore throat.

While incidence of POC was compared it was found that 20% of patients in Group BM and 15% of patients in Group IG had POC at 2hours, which became 5% in both groups at 6hours. No patient had POC at 12 and 24 hours in both groups. Incidence of POC at all-time points was statistically comparable in both groups (Figure 2). Comparison of POHV revealed that only 5% of patients in both groups had POHV at 2hours. At all later time points no patient had POHV. Incidence of POHV was similar in both groups throughout the study period (Figure 3).

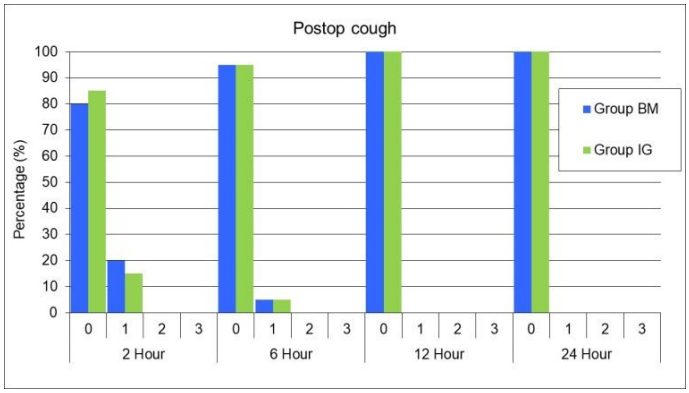

Figure 2: Incidence and severity of postoperative cough.

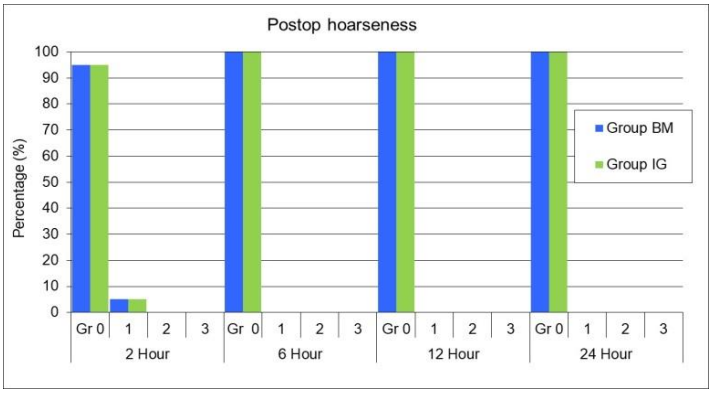

Figure 3: Incidence and severity of postoperative hoarseness.

Discussion

Supraglottic devices are devices that keep the upper airway patent for unobstructed ventilation under anesthesia. They are also called as extraglottic or periglottic airway devices. I Gel is a second generation supraglottic airway device which has been designed to create a non-inflatable, anatomical seal of the pharyngeal, laryngeal and perilaryngeal structures. The shape, softness and contours of I Gel accurately mirror the perilaryngeal anatomy. The advantages I Gel offer over the first generation supraglottic airway devices are presence of a non-inflatable cuff, integrated bite block, reduced incidence of trauma during insertion and an option for gastric access.

The new third-generation supraglottic airway device, Baska mask incorporates an airway tube with a tab to help negotiate the palato-pharyngeal curve. It has two large tubes entering the sump area for high suction clearance of the sump and a large sump reservoir to collect any fluid entering the pharynx. It is a self-sealing membrane cuff extraglottic airway in which cuff' seal is provided by a thin, pliable, conformable diaphragm which virtually adheres, at each breath, to the laryngeal introitus.

The functional analysis of I Gel with Baska mask during laparascopic surgeries with controlled ventilation was done by Ramaiah R et al [5] and Chaudhary [6]. It was found that both airways devices were suitable for laparascopic surgeries, but I-gel was quicker and easier to insert, while Baska mask gave good oropharyngeal airway seal. It was also noted that use of Baska mask as compared to endotracheal intubation significantly reduced the incidence and severity of pharyngo-laryngeal complications like POST,POC and POHV in patients undergoing short laparoscopic surgeries.[2]In another study which compared the utility of I-Gel with Baska Mask during general anesthesia in obese patients undergoing elective ambulatory surgeries it was found that postoperative airway morbidity rates were not significantly different between both groups [7]. V. Alexiev, et al. [8] also observed that the severity of throat discomfort, dysphagia and of dysphonia was low following use of Baska mask.

In a meta-analysis of randomized controlled trials, [9] it was found that LMA-Supreme and i-gel were equally successful and rapid in insertion. But, the LMA-Supreme was shown to be easier for gastric tube insertion and was associated with more sore throat than with use of I-gel.

Various studies have shown that use of LMA-Proseal produces more sore throat as compared to the I-gel [10-12]. Same conclusions were made with use of classical [13] and disposable LMA [14] as well. The lower incidence of sore throat with use of I Gel can be attributed to lack of inflatable mask. Since it is a supraglottic airway device without an inflatable mask, insertion of the device is easier and will result in minimal tissue compression also [15,16]. Supraglottic airway device with inflatable cuff can absorb anesthetic gases like nitrous oxide into the cuff resulting in higher intracuff pressures leading to increased mucosal damage [17] and subsequently higher postoperative pharyngolaryngeal complications.

Postoperative sore throat is commonly associated with hoarseness of voice and cough. Postoperative cough usually results from use of larger-sized endotracheal tubes and also following laryngeal trauma. Postoperative hoarseness of voice settles by the third post-operative day usually, the duration of which is decided by the age of patient and duration of intubation. Use of smaller-sized tubes and periodic measurement and adjustments of endotracheal tube cuff pressure greatly reduce mucosal damage and thereby postoperative hoarseness of voice [18].

In the present study it was shown that I Gel insertions were quicker and took lesser number of attempts at insertion. But the incidence of postoperative pharyngo-laryngeal complications was comparable with use of Baska mask. This could also be interpreted as an advantage of Baska mask over I Gel considering its additional ability to provide better sealing pressures during controlled ventilation and better gastric content drainage. Larger sample studies might provide more conclusive results on this regard. The drawbacks of our study were that it was an open label study and insertion of all the airway devices were not performed by a single anesthetist. Though the procedures were performed by anesthetists with minimum three years of experience, varying levels of individual skills could have influenced the results.

Conclusion

Incidence and severity of postoperative sore throat, hoarseness of voice and cough following use of two different supraglottic airway devices like I Gel and Baska mask did not show any significant difference despite I Gel insertions being faster and with fewer attempts for proper placement.

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