Section: Anesthesiology

Original Research Article

BASKA MASK AND ENDOTRACHEAL TUBE IN LAPAROSCOPIC SURGERIES AT TERTIARY CARE CENTRE: A PROSPECTIVE COMPARATIVE STUDY

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Received *: 29/08/2025*
Received in revised form *: 12/10/2025*
Accepted *: 31/10/2025*

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DOI: 10.70034/ijmedph.2025.4.512

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (4); 2864-2867

ABSTRACT

Background: Two primary airway management devices commonly employed in laparoscopic surgeries are Baska Mask and endotracheal tube (ETT). Baska Mask, a novel supraglottic airway device, offers several advantages over traditional laryngeal masks, including a superior sealing pressure, reduced risk of aspiration, and enhanced patient comfort. In contrast, ETT remains a stalwart in airway management, providing secure access to the trachea for controlled ventilation and airway protection. The objective is to evaluate the effectiveness of baska mask in comparison with endotracheal tube in securing and maintaining the airway with minimal haemodynamic changes in laparoscopic surgeries.

Materials and Methods: Prospective, comparative study was carried out among 80 cases who were divided in two groups. Group A had 40 cases wherein airway was secured with baska mask. Group B had 40 cases wherein airway was secured with endotracheal tube. Ease of airway insertion, airway insertion complications, placement time, heart rate, systolic blood pressure, diastolic blood pressure, arterial pressure, airway pressure, were compared.

Results: Both groups were comparable for baseline characteristics like age, sex, and ASA grade ($p>0.05$). Both groups were comparable for ease of airway insertion and airway insertion complications but placement time was significantly more in group B. Heart rate was significantly more in group B at intubation and extubation. Systolic blood pressure, diastolic blood pressure, arterial pressure, and airway pressure were significantly more at extubation in group B compared to group A.

Conclusion: Both methods were found to be effective, but the Baska mask demonstrated comparable efficacy in terms of airway stability and ventilation adequacy.

Keywords: Baska Mask, surgery, management.

INTRODUCTION

Laparoscopic surgeries have emerged as the cornerstone of modern surgical practice, revolutionizing the approach to numerous intra-abdominal procedures across various surgical specialties. Unlike traditional open surgeries, laparoscopic techniques involve accessing the abdominal cavity through small incisions, facilitated by the insufflation of carbon dioxide to create a pneumoperitoneum. This innovative approach offers a plethora of advantages, including reduced surgical trauma, diminished postoperative pain, faster recovery times, and improved cosmetic outcomes. However, the creation of a pneumoperitoneum presents unique challenges in terms of anesthesia management, particularly regarding ventilation and airway control.[1,2]

Effective anesthesia management during laparoscopic procedures necessitates careful consideration of numerous factors, including the patient's pre-existing medical conditions, the type

and duration of surgery, and the physiological effects of pneumoperitoneum. Of paramount importance is the selection of appropriate airway management devices and ventilation strategies to ensure optimal oxygenation, ventilation, and patient safety throughout the surgical procedure.[3,4]

Two primary airway management devices commonly employed in laparoscopic surgeries are the Baska Mask and endotracheal tube (ETT). The Baska Mask, a novel supraglottic airway device, offers several advantages over traditional laryngeal masks, including a superior sealing pressure, reduced risk of aspiration, and enhanced patient comfort. Its innovative design incorporates features such as a pharyngeal chamber to prevent regurgitation and a unique cuff shape to minimize airway trauma, making it particularly well-suited for use in laparoscopic procedures.[5,6]

In contrast, the endotracheal tube remains a stalwart in airway management, providing secure access to the trachea for controlled ventilation and airway protection. Its ability to maintain a patent airway and facilitate lung isolation makes it indispensable in certain surgical scenarios, including procedures requiring prolonged pneumoperitoneum or patients with pre-existing airway pathology.[7]

With this background, present study was carried out to evaluate the effectiveness of baska mask in comparison with endotracheal tube in securing and maintaining the airway with minimal haemodynamic changes in laparoscopic surgeries.

MATERIALS AND METHODS

The present study was a prospective, comparative study. It was a hospital based study. A total of 80 cases undergoing laparoscopic surgery were studied in the department of anesthesiology, Malla Reddy Institute of Medical Sciences, Hyderabad over a period of one an half year.

Patients scheduled for elective laparoscopic surgeries including day care, short stay and inpatient surgery, aged 18 to 65 years, belonging to American society of Anesthesiologists (ASA) classification I and II, patients with body mass index (BMI) ≤ 35 kg/m2 were included in the present study. Patients with history of difficult intubation or anesthetic complications, patients with anticipated difficult airway, patients with features of facial, laryngeal, pharyngeal anatomical defects were excluded. Written informed consent was obtained. Institutional Ethics Committee permission was obtained.

Of the total 80 cases included in the present study, the two groups were formed. Group A had 40 cases wherein the airway was secured with the help of baska mask. Group B had 40 cases wherein the airway was secured with endotracheal tube. All the details were recorded in the pre designed, pre tested, semi structured study questionnaire. Parameres like, age, sex, ASA categories, anthropometry like height, weight, body mass index were compared in two groups. Airway parameters like thyromental distance, inter-incisor distance, neck movements were also compared. Other parameters like ease of airway insertion, airway insertion complications, placement time, mean heart rate, mean systolic blood pressure, mean diastolic blood pressure, mean arterial pressure, mean airway pressure, mean end-tidal carbon dioxide, complications were also compared. The data was expressed as percentage and/or mean with standard deviation. P value of less than 0.05 was considered as statistically significant. For comparison of mean values in two groups, the independent samples t test was used.

RESULTS

Both the groups were comparable for baseline characteristics like age, sex, and ASA grade (p>0.05). [Table 1]

Table 1: Comparison of baseline characteristics in two groups

Characteristics		Group A	Group B	P value
Age (years)	18-35	9 (22.5%)	7 (17.5%)	0.5823
	36-55	19 (47.5%)	26 (65%)	
	56-65	12 (30%)	7 (17.5%)	
Gender	Male	23 (57.5%)	25 (62.5%)	0.6319
	Female	17 (42.5%)	15 (37.5%)	
ASA grade	I	28 (70%)	30 (75%)	0.491
	II	12 (30%)	10 (25%)	

Table 2: Comparison of airway and other parameters in two groups

Characteristics		Group A	Group B	P value
Airway parameters	Thyromental distance ≥ 60 mm	36 (90%)	34 (85%)	0.558
	Interincisor distance ≥ 40 mm	33 (82.5%)	34 (85%)	0.813
	No dentures	34 (85%)	33 (82.5%)	0.557
Ease of airway insertion	Attempt 1	37 (92.5%)	36 (90%)	0.556
	Attempt 2	3 (7.5%)	2 (5%)	
Airway insertion complications	None	38 (95%)	35 (62.5%)	0.861
	Yes	02 (5%)	05 (37.5%)	
Placement time (min)		15.43±5.12	31.81±5.98	0.001

In terms of airway parameters both the groups were comparable. Ease of airway insertion and airway

insertion complications was also similar in two groups. But the placement time was relatively and significantly more in group B. [Table 2]

Table 3: Comparison of hemodynamic parameters in two groups

Parameters		Group A	Group B	P value
Heart rate/min	Preoperative	72.11 ± 16.89	71.77 ± 14.13	0.248
	Intubation	88.31 ± 20.23	93.75 ± 17.41	0.01
	Extubation	81.95 ± 12.93	93.65 ± 12.15	0.002
Systolic blood pressure (mmHg)	Preoperative	121.41 ± 11.16	121.89 ± 10.09	0.3315
	Intubation	125.26 ± 10.68	127.22 ± 9.22	0.061
	Extubation	128.74 ± 10.1	139.3 ± 9.54	0.0001
Diastolic blood pressure (mmHg)	Preoperative	79.26 ± 8.07	79.07 ± 8.15	0.933
	Intubation	77.37 ± 8.15	78.59 ± 7.67	0.573
	Extubation	83.78 ± 8.14	97.07 ± 8.02	0.0001
Arterial pressure (mmHg)	Preoperative	92.63 ± 9.06	91.44 ± 10.08	0.651
	Intubation	89.63 ± 8.5	90.52 ± 7.42	0.684
	Extubation	92.63 ± 8.94	102.3 ± 7.87	0.0001
Airway pressure (mmHg)	1st min after intubation	9.53 ± 2.31	12.86 ± 1.95	0.04
	2nd min after intubation	9.45 ± 2.17	12.58 ± 1.75	0.04
	3rd min after intubation	9.99 ± 2.63	12.79 ± 1.61	0.01

Heart rate was significantly more in group B at intubation and extubation. Systolic blood pressure, diastolic blood pressure, arterial pressure, and airway pressure were comparable in two groups before surgery and at intubation but was significantly more at extubation in group B compared to group A. [Table 3]

DISCUSSION

Laparoscopic gynecological surgery is a common procedure performed on a short-stay basis. The use of Laryngeal mask airways has several benefits, including avoiding complications, quick and simple placement, reduced neuromuscular blockade need, and lower postoperative adverse events like sore throat, dysphagia, and dysphonia.[8] However, the use of LMAs in laparoscopy is controversial due to concerns about the risk of regurgitation, lung aspiration. The new generation of LMAs protect against regurgitation and stop gastric insufflation, making them a good choice for procedures like laparoscopy. The BASKA mask is a new supraglottic airway device that has similar parts to other supraglottic airways but some unique features. It has an inlet designed to go into the upper oesophagus and suction attached to side channels on the dorsal surface of the cuff to drive oropharyngeal contents away from the glottis. These modifications make the BASKA mask airway a desirable, safe, and efficient airway equipment for low-risk patients undergoing gynecologic laparoscopic surgery.[9] The traditional practice of tracheal intubation with a cuffed tube has been used for general anesthesia during laparoscopic surgeries, but it can be dangerous in high-risk patients, particularly those with compromised brain or cardiovascular systems.[10] Supraglottic airway devices (SADs), such as the Baska mask, have become more common due to their lesser hemodynamic responses and better airway protection. However, concerns about increased risk of aspiration, difficulties in maintaining gas transfer, and dislodgement of SADs due to patient positioning have led many anesthesiologists to prefer tracheal intubation.[11] The introduction of second-generation SADs has increased their use during laparoscopic surgery, but a direct comparison of Baska mask insertion to tracheal intubation remains less explored.[12]

Both the groups were comparable for baseline characteristics like age, sex, and ASA grade (p>0.05). Our study was in correlation with Syed Thahir Hussain S, Herady MV, Nagabhushanam K et al, Prasath AK et al.[13-16]

In terms of airway parameters both the groups were comparable. Ease of airway insertion and airway insertion complications was also similar in two groups. But the placement time was relatively and significantly more in group B. Our study was in correlation with Chahar N et al, Shah MH, Ramaiah R et al.[17-19]

Heart rate was significantly more in group B at intubation and extubation. Systolic blood pressure, diastolic blood pressure, arterial pressure, and airway pressure were comparable in two groups before surgery and at intubation but was significantly more at extubation in group B compared to group A. Our study was in correlation with Tosh P et al.[10]

CONCLUSION

The study evaluated the effectiveness of the Baska mask compared to the traditional endotracheal tube (ETT) in securing and maintaining the airway during laparoscopic surgeries. Both methods were found to be effective, but the Baska mask demonstrated comparable efficacy in terms of airway stability and ventilation adequacy. It also offered advantages such as reduced risk of airway trauma and improved patient comfort, contributing to patient satisfaction and postoperative recovery. The Baska mask was associated with minimal hemodynamic changes compared to the ETT, which is crucial for preventing perioperative complications and ensuring favorable

surgical outcomes. This is due to its unique design, which minimizes airway manipulation and reduces sympathetic stimulation. However, the study's limitations include a small sample size, which may limit the generalizability of the findings to broader patient populations. Future research should focus on larger sample sizes and multicenter studies to provide more insights. The study also primarily focused on short-term outcomes during the intraoperative period, with limited assessment of postoperative complications and long-term patient outcomes. In conclusion, the Baska mask is a promising alternative to the ETT in airway management in laparoscopic surgeries, but further research is needed to confirm these findings and explore the long-term implications.

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