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# A Comparison between Baska Mask and Endotracheal Tube in Patients Undergoing Gynecological Laparoscopic Surgery

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## ABSTRACT

**Background:** Gynecological laparoscopy is a popular day-case or short-stay surgery. Laryngeal mask airway (LMA) provides various advantages over tracheal intubation (TI), including less postoperative adverse effects like sore throat, dysphagia, and dysphonia, faster and easier airway device placement, and less neuromuscular blockade. Correctly positioned new-generation LMAs prevent stomach insufflation and regurgitation. Laparoscopy, which has high peak airway pressure, can be anaesthetized with these devices.

**Objective:** This study aimed to compare the effects of the Baska Mask and endotracheal tube on hemodynamic parameters (heart rate, mean arterial pressure), airway pressure and $EtCO_2$ values

**Patients and methods:** This prospective randomized study was conducted on 60 patients through the period from January 2021 to September 2022 at Al-Azhar University Hospitals (Assiut). They were ASA class I or II, scheduled for elective gynecological laparoscopic surgery and had mean age of 45.42 ± 8.53 years.

**Results:** HR was significantly higher in B group regarding measurements at 60 and 90 min. BIS was significantly higher in B group compared to E group regarding measurements at baseline, after induction/before laryngoscopy, after laryngoscopy, during intubation/insertion and at 1, 3, 5, 10, 20, 30, 40, 50, 60, 90 and 120 min. Peak airway pressure was significantly higher in E group regarding measurements at baseline after induction/before laryngoscopy, after laryngoscopy, during intubation/insertion and at 1, 3, 5, 10, 20, 30, 40, 50, 60, 90 and 120 min. Also, leak pressure was significantly higher in E group compared to B group at all times of measurements. Between the groups, there was a considerable difference in insertion time.

**Conclusion:** The current investigation corroborated the findings of previous studies conducted on individuals having general surgery. The efficacy of the Baska mask was shown to be comparable to that of endotracheal intubation for female patients receiving elective laparoscopic gynaecological surgery who were ventilated during general anaesthesia.

**Keywords:** Baska mask, Endotracheal tube, Gynecological.

## INTRODUCTION

One of the most prevalent types of surgery is laparoscopic gynecological surgery, it is usually performed on a day-case or short-stay basis. Theoretically, when compared to tracheal intubation (TI), the use of LMA has a number of benefits, including the avoidance of complications related to TI, quick and simple placement of the airway device itself, a reduced need for neuromuscular blockade, and a lower incidence of postoperative adverse events like sore throat, dysphagia, and dysphonia [(1)]. But using the LMA in laparoscopy is debatable because to concern regarding a higher risk of regurgitation and lung aspiration and a decreased ability to breath because of the pneumo-peritoneum that comes with it. People have also questioned whether or not these tools can give the best ventilation during laparoscopic treatments. The seal pressure of the airway is the most important factor in making sure that the LMA has enough airflow and respiration when it is in a pneumoperitoneum condition. A good sealing pressure not only makes sure the patient is getting enough air, but it also lowers the risk of aspiration because the mouth is better sealed [(2)].

When placed correctly, the new generation of LMAs protect against regurgitation and stop gastric insufflation. When giving anesthesia for a treatment like laparoscopy, which has a high peak airway pressure, these devices are a good choice [(3)].

The BASKA mask is a new breathing device (Logikal Health Products PTY Ltd, Morisset, NSW, Australia). It has a lot of the same parts as other supraglottic airways, as well as a few parts that are unfamiliar [(4)]. An inlet on the BASKA mask is designed to go into the upper oesophagus. In order to assist clear this region, suction can be attached to the side channels on the dorsal surface of the cuff, which is intended to drive any oropharyngeal contents away from the glottis [(5)]. These traits may make it less likely that secretions or stomach contents will get into the lungs if they build up in the supraglottic area [(6)]. Due to these modifications, the BASKA mask airway is now a desirable, safe, and efficient airway equipment for low-risk patients undergoing gynecologic laparoscopic surgery [(7)].

The goal of this study was to find out how the Baska Mask and endotracheal tube affect the HR and MBP.

## PATIENT AND METHODS

The prospective randomized study was conducted on 60 patients aged 20 to 60 years at Al-Azhar University Hospitals (Assiut). They were American Society of Anesthesiologists (ASA) class I or II and scheduled for elective gynecological



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laparoscopic surgery through the period from January 2021 to September 2022.

By cracking open an opaque envelope in the operating room that contained the computer-generated random assignment into two groups of 30 patients each. Patients were randomised for airway care with Baska mask and ETT. Group B (Baska group) undergone Baska mask insertion, and group E (endotracheal group) undergone endotracheal intubation. An observer opened the sealed, opaque packets with the random sequence soon before general anaesthesia was administered. The manufacturer's weight-based recommendations were used to determine the size of each item.

**Exclusion criteria:** People with insufficient mouth opening. BMI more than 26 $kg/m^2$. A challenging airway is anticipated. The patient's elevated aspiration risk. Pathology of the oropharynx. A serious respiratory condition.

**Preoperative preparation:** In the pre-anesthesia room, each patient underwent a physical examination, and the questionnaire on sore throat and hoarseness of voice was explained to them. A sore throat is described as ongoing discomfort or soreness in the throat that does not interfere with swallowing. Hoarseness, which is characterised as an unnatural shift in voice, is frequently felt together with a dry or scratchy throat. Standard monitoring equipment [General Electric (USA)] was placed in the operating room, and baseline values were collected. The workstation on the head side of the operating table was where the monitoring tools and anaesthetic medications used during general anaesthesia were maintained. After being removed from its sterile packet, the Baska mask's integrity and functionality were examined by using one thumb to block the airway opening of the proximal connection end, one hand to hold the mask head, and the other to close the airway opening. To ensure there were no leaks in the device, pressure was applied for 5 s using a reservoir bag squeeze. A water-based lidocaine (lignocaine) gel was then applied to the whole mask's body to lubricate it. The time between picking up the Baska mask and the first capnography trace appearing was used to calculate the insertion time of the Baska mask, which was measured in seconds. The insertion time for ETT, on the other hand, was calculated from the direct laryngoscopy to the onset of the first capnography trace.

**Induction of anesthesia:** The patient's baseline parameters, PR, MAP, and $SpO_2$ were recorded after the IV line was secured, along with all routine monitors such as the ECG, non-invasive blood pressure, and pulse oximeter. Peroxygenation was then performed with $FiO_2$ 100% for three minutes.

General anesthesia was induced by injection of propofol 1.5–2.5 mg/kg (Fresenius Kabi Deutschland Gmbh) and Fentanyl 1.5 μg/kg IV (Hameln pharma Gmbh, Germany). Atracurium 0.5 mg/kg IV injection (Hameln pharma Gmbh, Germany) was used to induce neuromuscular blockade to enable the implantation of the device. In each group, the matching airway was placed after induction and sufficient paralysis. A size 3 Baska mask was employed for group B in accordance with their weight. Endotracheal intubation (7–7.5 females) was carried out as usual in group E. After the appropriate set of patients had their Baska masks placed and been intubated, oxygen and Atracurium were used to keep them under anaesthesia. By shutting the adjustable pressure limiting valve at 70 cm $H_2O$ and measuring the seal pressure in cm of $H_2O$ at 10 minutes after the Baska mask was applied. The seal pressure was determined as the plateau pressure with new gas flow at 6 liters. Ten minutes after intubation, the cuff pressure of the ETT was assessed using an aneroid manometer (Sphygmomanometer). ETT cuff pressure was monitored and noted when the aneroid manometer was attached to the pilot balloon of the ETT cuff through a three-way stopcock. Auscultation, square wave capnography, appropriate chest movement during manual ventilation, an expired tidal volume of more than 8 ml/kg, the absence of an audible leak, and all of these factors supported the installation of the devices correctly. Neostigmine + atropine injection was administered as a reversal at the conclusion of operation. Baska mask and ETT were removed when the patient was awake and responding to orders.

**Assessment Parameter:**

1) **Demographic data:** age, BMI and residence.
2) **Assessement comorbidities:** DM, HTN, previous operations.
3) Mallampati score.
4) **Operation characteristics:** ASA classification and operative time.
5) **Hemodynamics:** HR, MAP,$O_2$ saturation ($spO_2$%) and $EtCO_2$, all of these parameters were recorded before induction, during induction/after laryngoscopy, during intubation/insertion of the Baska mask and 1, 3, 5, 10, and 15 minutes after device insertion. Then, every 10 minutes until the end of the first hour and then every 30 minutes until the end of the surgery.
6) **BIS** (Bispectral index)
7) **Respiratory measurements:** Including exhaled tidal volume, peak air way pressure, mean airway pressure, leak pressure and leak fraction. These parameters were recorded at the same time points mentioned above.
8) **Clinical characteristics:** Insertion time, anaesthesia time, insuffluation time and removal time.
9) **Post-operative complications:** As sore throat, hoarseness of voice and dysphagia were assessed at 1, 2, 4, 8, 12, and 24 h postoperatively.

**Ethical approval: Al-Azhar Medical Ethics Committee of Al-Azhar Faculty of Medicine gave its approval to this study. All participants gave written consents after receiving all information. The Helsinki Declaration was followed throughout the study's conduct.**

***Statistical analysis***

The SPSS V. 27 statistical analysis programme was used. Histograms and the Shapiro-Wilks test were employed to assess the normality of the data distribution. Mean ± SD were used to show quantitative parametric data, and an ANOVA (F) test with a Tukey post hoc test were used to evaluate the data. For comparison between the two groups, the student t test was utilised. The Chi-square test was used to examine qualitative data, which were reported as frequency and percentage (%). Cohen's Kappa is used to measure agreement. A dependent variable's connection to one or more independent variables was also estimated using logistic regression. Statistical significance was defined as a two-tailed P value ≤ 0.05.

## RESULTS

Table (1) showed the demographic and clinical characteristics of the studied patients in which the two groups were matched, and the difference was not significant statistically for all variables (P > 0.05). As regards the operative time of the studied patients, the mean operative time was 81.65 ± 25.21 minutes in group B versus 84.37 ± 28.43 minutes in group E (P = 0.34). ASA classification of the studied patients revealed that 33.3% of the patients in group B were grade 1 versus 36.7% of the patients in group E, and 56.7% of the group B patients were grade II versus 56.7% of group E patients.

**Table (1):** Demographic and clinical data of the two studied groups

| | ***Group B (N=30)*** | ***Group E (N=30)*** | ***P*** |
|---|---|---|---|
| ***Age (years) Mean ± SD*** | 45.42 ± 8.53 | 47.16 ± 9.34 | .454 |
| ***BMI (kg/m$^2$) Mean ± SD*** | 26.22 ± 2.57 | 26.87 ± 2.68 | .342 |
| ***Resident*** | | | |
| ***Rural*** | 16 (53.3%) | 17 (56.7%) | .795 |
| ***Urban*** | 14 (46.7%) | 13 (43.3%) | |
| *Comorbidities* | | | |
| ***Hypertension*** | 6 (20%) | 5 (16.7%) | .739 |
| ***DM*** | 5 (16.7%) | 4 (13.3%) | .718 |
| ***Previous operation*** | 10 (33.3%) | 11 (36.7%) | .787 |
| Mallampati score | | | |
| ***Grade I*** | 10 (33.3%) | 11 (36.7%) | .87 |
| ***Grade II*** | 17 (56.7%) | 17 (56.7%) | |
| ***Grade III*** | 3 (10%) | 2 (6.7%) | |

In terms of the mean arterial blood pressure (MABP) changes, we found no significant difference between the two studied groups regarding MABP at all times of measurements (Table 2). According to the heart rate changes, the 2 groups were comparable at all times of measurement except at 60 and 90 min in which the HR was higher in B group (P value = 0.01, and 0.04 respectively). As regards the $SpO_2$ changes, we found no significant difference between the two studied groups regarding $SpO_2$ at all times of measurements.

According to BIS, table (3) showed that it was significantly higher in B group compared to E group regarding measurements at baseline, after induction, after laryngoscopy, during insertion at 1 min, 3 min, 5 min, 10 min and 20 min. As regards the $EtCO_2$, the tidal volume, and the mean airway pressure, the difference between the two studied groups at all times of measurements was not significant (P value > 0.05 for all). In terms of the peak airway pressure, it was significantly higher in E group regarding measurements at baseline, after induction, after laryngoscopy, during intubation and at 1 min (P value < 0.05 for all).

**Table (2):** MABP (mmHg) changes between the two studied groups

| | ***Group B (N=30)*** | ***Group E (N=30)*** | ***P*** |
|---|---|---|---|
| ***Baseline (before induction) Mean ± SD*** | 89.89 ± 9.75 | 91.32 ± 11.6 | 0.607 |
| ***After induction/before laryngoscopy Mean ± SD*** | 87.62 ± 8.31 | 88.78 ± 8.52 | 0.596 |
| ***After laryngoscopy Mean ± SD*** | 85.68 ± 6.34 | 87.47 ± 7.45 | 0.320 |
| ***During intubation/insertion Mean ± SD*** | 88.72 ± 8.23 | 89.43 ± 7.43 | 0.727 |
| ***at 1 min Mean ± SD*** | 91.82 ± 9.34 | 92.36 ± 12.8 | 0.853 |
| ***At 3 min Mean ± SD*** | 87.89 ± 6.75 | 89.32 ± 7.61 | 0.444 |
| ***At 5 min Mean ± SD*** | 85.27 ± 7.37 | 87.91 ± 8.53 | 0.205 |
| ***At 10 min Mean ± SD*** | 84.11 ± 8.19 | 85.63 ± 9.64 | 0.513 |
| ***At 20 min Mean ± SD*** | 89.48 ± 6.38 | 90.17 ± 7.79 | 0.709 |
| ***30 min Mean ± SD*** | 92.72 ± 7.53 | 96.4 ± 11.56 | 0.149 |
| ***40 min Mean ± SD*** | 91.35 ± 7.85 | 94.77 ± 8.21 | 0.105 |
| ***50 min Mean ± SD*** | 89.45 ± 6.43 | 90.63 ± 8.58 | 0.549 |
| ***60 min Mean ± SD*** | 88.52 ± 7.11 | 90.95 ± 7.63 | 0.207 |
| ***90 min Mean ± SD*** | 86.74 ± 6.56 | 89.61 ± 8.85 | 0.159 |
| ***120 min Mean ± SD*** | 83.35 ± 5.21 | 85.2 ± 7.41 | 0.268 |

**Table (3):** BIS index of the two studied groups

| | *Group B (N=30)* | *Group E (N=30)* | *P* |
|---|---|---|---|
| ***Baseline (before induction) Mean ± SD*** | 58.79 ± 9.52 | 53.72 ± 10.11 | **0.034** |
| ***After induction/before laryngoscopy Mean ± SD*** | 57.62 ± 8.62 | 51.52 ± 10.21 | **0.031** |
| ***After laryngoscopy Mean ± SD*** | 55.82 ± 8.71 | 51.02 ± 11.07 | **0.028** |
| ***During intubation/insertion Mean ± SD*** | 54.79 ± 8.11 | 50.72 ± 11.61 | **0.040** |
| ***at 1 min Mean ± SD*** | 54.01 ± 9.02 | 50.11 ± 10.71 | **0.039** |
| ***At 3 min Mean ± SD*** | 53.49 ± 9.12 | 49.92 ± 9.61 | **0.037** |
| ***At 5 min Mean ± SD*** | 53.09 ± 9.52 | 49.32 ± 9.31 | **0.039** |
| ***At 10 min Mean ± SD*** | 53.19 ± 8.71 | 48.23 ± 9.62 | **0.041** |
| ***At 20 min Mean ± SD*** | 49.6 ± 8.49 | 45.26 ± 7.38 | **0.039** |
| ***30 min Mean ± SD*** | 45.73 ± 9.37 | 42.59 ± 8.53 | 0.180 |
| ***40 min Mean ± SD*** | 46.83 ± 9.56 | 43.78 ± 9.45 | 0.219 |
| ***50 min Mean ± SD*** | 46.15 ± 8.12 | 44.65 ± 8.62 | 0.491 |
| ***60 min Mean ± SD*** | 45.38 ± 7.42 | 42.95 ± 8.65 | 0.258 |
| ***90 min Mean ± SD*** | 41.98 ± 8.33 | 44.55 ± 7.91 | 0.225 |
| ***120 min Mean ± SD*** | 41.46 ± 7.49 | 43.82 ± 6.53 | 0.199 |

According to the leak pressure, it was significantly higher in E group compared to B group at all times of measurements (Table 4). However, the mean leak fraction was significantly higher in B group compared to E group regarding measurements at 60, 90 and 120 min (P = 0.04, 0.04, 0.02 respectively).

**Table (4):** Leak pressure of the two studied groups

| | *Group B (N=30)* | *Group E (N=30)* | *P* |
|---|---|---|---|
| ***Baseline (before induction) Mean ± SD*** | 30.4 ± 6.41 | 35.38 ± 3.59 | **0.001** |
| ***After induction/before laryngoscopy Mean ± SD*** | 30.22 ± 6.53 | 36.15 ± 3.21 | **<0.001** |
| ***After laryngoscopy Mean ± SD*** | 31.46 ± 6.37 | 38.61 ± 2.27 | **<0.001** |
| ***During intubation/insertion Mean ± SD*** | 31.96 ± 6.17 | 38.72 ± 2.57 | **<0.001** |
| ***at 1 min Mean ± SD*** | 32.46 ± 6.05 | 37.91 ± 2.86 | **<0.001** |
| ***At 3 min Mean ± SD*** | 32.16 ± 5.97 | 37.82 ± 2.73 | **<0.001** |
| ***At 5 min Mean ± SD*** | 33.5 ± 5.91 | 37.78 ± 2.61 | **0.001** |
| ***At 10 min Mean ± SD*** | 35.35 ± 5.84 | 38.51 ± 3.18 | **0.012** |
| ***At 20 min Mean ± SD*** | 34.72 ± 5.98 | 37.56 ± 2.71 | **0.021** |
| ***30 min Mean ± SD*** | 34.28 ± 5.52 | 37.41 ± 2.54 | **0.007** |
| ***40 min Mean ± SD*** | 33.78 ± 6.33 | 37.98 ± 2.69 | **0.001** |
| ***50 min Mean ± SD*** | 32.92 ± 6.44 | 37.75 ± 2.76 | **<0.001** |
| ***60 min Mean ± SD*** | 32.17 ± 6.51 | 37.61 ± 2.83 | **<0.001** |
| ***90 min Mean ± SD*** | 31.92 ± 6.54 | 37.57 ± 2.91 | **<0.001** |
| ***120 min Mean ± SD*** | 31.52 ± 6.83 | 37.87 ± 2.93 | **<0.001** |

In terms of the intubation characteristics of the two studied groups, table (5) showed that there was a significant difference between the groups regarding insertion time, but there was no significant difference between studied groups as regards anesthesia time, insufflation time and removal time (Table 5).

**Table (5):** Intubation characteristics among the two studied groups

| | *Group B (N=30)* | *Group E (N=30)* | *P* |
|---|---|---|---|
| ***Insertion time (sec) Mean ± SD*** | 20.54 ± 9.61 | 41.62 ± 15.47 | **<0.001** |
| ***Anesthesia time (min) Mean ± SD*** | 108.61 ± 42.34 | 105.49 ± 38.92 | 0.768 |
| ***Insufflation time (min) Mean ± SD*** | 57.25 ± 31.73 | 59.82 ± 28.46 | 0.742 |
| ***Removal time (min) Mean ± SD*** | 6.73 ± 2.85 | 7.65 ± 2.61 | 0.197 |

As regards the postoperative complications, table (6) showed that there was a significant difference between the groups regarding sore throat at 1 hour, 2 hours and 4 hours postoperatively. Moreover, there was a reduction in complication incidence from 2 hour to 24 hours postoperatively regarding sore throat in both groups. Regarding hoarseness of voice incidence postoperatively, there was no significant difference between the groups. But, there was a reduction in hoarseness of voice incidence from 2 hour to 24 hours postoperatively in group B, and there was a decrease in Hoarseness of voice incidence from 8 hour to 24 hours postoperatively in group E. Table (6) also showed no significant difference between both groups regarding dysphagia incidences postoperatively. However, there was an increase in dysphagia incidence from 1 hour to 24 hours in both group.

**Table (6):** Postoperative complications distribution among the studied groups

| | *Group B (N=30)* | *Group E (N=30)* | *P* |
|---|---|---|---|
| ***Sore throat*** | | | |
| ***After 1 hour*** | 5 (16.7%) | 16 (53.3%) | **0.003** |
| ***After 2 hours*** | 6 (20%) | 16 (53.3%) | **0.007** |
| ***After 4 hours*** | 4 (13.3%) | 10 (33.3%) | **0.006** |
| ***After 8 hours*** | 3 (10%) | 6 (20%) | 0.285 |
| ***After 12 hours*** | 2 (6.6 %) | 4 (13.3%) | -- |
| ***After 24 hours*** | 1 (3.3%) | 2 (6.6%) | 0.417 |
| ***Hoarseness of voice*** | | | |
| ***After 1 hour*** | 6 (20%) | 5 (16.6%) | 0.129 |
| ***After 2 hours*** | 7 (23.3%) | 5 (16.6%) | 0.095 |
| ***After 4 hours*** | 6 (20%) | 5 (16.6%) | 0.347 |
| ***After 8 hours*** | 4 (13.3%) | 5 (16.6%) | 0.754 |
| ***After 12 hours*** | 1 (3.3%) | 2 (6.6%) | 0.347 |
| ***After 24 hours*** | 1 (3.3%) | 2 (6.6%) | 0.136 |
| ***Dysphagia*** | | | |
| ***After 1 hour*** | 2 (6.6%) | 4 (13.3%) | 0.129 |
| ***After 2 hours*** | 3 (10%) | 4 (13.3%) | 0.197 |
| ***After 4 hours*** | 4 (13.3%) | 5 (16.7%) | 0.223 |
| ***After 8 hours*** | 4 (13.3%) | 6 (20%) | 0.405 |
| ***After 12 hours*** | 6 (20%) | 7 (23.3%) | 0.285 |
| ***After 24 hours*** | 7 (23.3) | 8 (26.7%) | 0.275 |

## DISCUSSION

In the current study the baseline characteristics were well-matched among the studied groups, as regarding age, BMI, and persistent comorbidities. There was no statistically significant difference between the two studied groups, Mallampati score and ASA classification. The use of either Baska mask or endotracheal intubation had no effect on operative time. In agreement with the current study, **Ahn *et al.*** [6] compared the safety and efficacy of the Baska mask and endotracheal intubation (ET) in 62 female patients undergoing elective laparoscopic gynaecological surgery while lying in the Trendelenburg position. According to the study, there was no statistically significant difference in the two groups' average operating times, ASA classification, Mallampati scores, comorbidities and BMIs, or age. The use of BASKA as an alternative to endotracheal intubation in low-risk females undergoing brief gynecologic laparoscopic operations in the Trendelenburg position while under general anaesthesia and positive pressure breathing was also studied by **Tosh *et al.*** [8]. In order to assist regulate their airways. 65 females with ASA (I-II) between the ages of 19 and 43 were assigned to either receive an endotracheal tube (ETT group, N=32) or a BASKA mask (BASKA group, N=33). Age, BMI, comorbidities, Mallampati score, ASA classification, and operating time between the two groups did not differ statistically significantly.

Also, **Ng *et al.*** [9] compared the Baska mask to ETT in patients who were having a planned laparoscopic cholecystectomy. The study examined two groups of 30 patients each and found that there was not statistically significant difference in age, BMI, comorbidities, Mallampati score and ASA classification, or operative time between the two groups.

Also, **Abdel-Ghaffar *et al.*** [7] aimed to assess how the blood flow changed when a Baska mask was put on versus when a tracheal tube was put in. The time and number of attempts to open the airway, as well as any signs of regurgitation or pulmonary aspiration of stomach contents, were also taken into considerations. Randomly, 80 people getting a laparoscopic cholecystectomy were split into two similar groups. The study found that there was not statistically significant difference between the two groups in terms of age, weight, comorbidities, ASA classification, and operating time. Additionally, in patients under general anaesthesia, **Kuşderci *et al.*** [10] examined the effects of the Baska mask, a new generation supraglottic airway mask, and the ETT on hemodynamic parameters (HR, MAP), airway pressure, and $EtCO_2$. 35 instances were split between the two groups. In terms of their demographics and the amount of time they spent in surgery, both groups were comparable.

According to the results of the current study, there was no statistically significant difference in MAP

between the two groups evaluated at any point in the measurements. In agreement with the current study, **Mishra *et al.*** [11] found that there was no difference in MAP between the study groups at all of the measurement periods. However, **Misganaw *et al.*** [12] revealed that baseline MAP was comparable in both groups. With the exception of 10 minutes, this difference was statistically significant at all-time intervals. After tracheal intubation, the endotracheal tube group's mean MAP was consistently higher than the Baska group's mean MAP. Also, contrary to what our results showed, **Obsa *et al.*** [13] revealed that there was a statistically significant rise in MAP in Group E at the time of ETT insertion and at 1, 3, and 5 min after insertion (P 0.05). This was not the case in group B. During the placement of the device, group E's MAP went up by 24%, while group B's only went up by 8%. When MAP was compared between group B and group E at 10 and 15 min, there was not statistically significant change. After that, MAP was checked every 10 minutes until the surgery was over. Even after the device was taken away, between the two groups, there was no statistically significant difference (P > 0.05). Additionally, **Patodi *et al.*** [14] demonstrated a significant difference in mean arterial pressure between the two groups when the devices were inserted and removed, with the ETT group demonstrating a significant increase in both values when the devices were inserted and removed (p 0.05). It's possible that variations in sample size and methodological information are responsible for the differences between researches.

The current study found that the B group had a significantly greater HR during the 60 and 90 minute measures, whereas the other values were similar between groups. However, **Rajan *et al.*** [15] revealed that the baseline HR in both groups was similar. The endotracheal tube group, however, had a greater heart rate immediately following tracheal intubation as well as at 1, 3, and 5 and 10 minutes later, according to a comparison of alterations in hemodynamics. With the exception of 10 minutes, this difference was statistically significant at all time periods.

Also, **Hemlata *et al.*** [16] revealed that It was also found that group E had a statistically significant increase in HR after device insertion at 1, 3, and 5 minutes compared to group B. Then, at 10 and 15 minutes post-insertion, there were some statistically insignificant differences (P 0.05) in HR between group E and group B. No statistically significant variation in HR was seen between the groups despite monitoring at 10-minute intervals from the beginning of operation until the removal of the device. As well, **Parikh *et al.*** [17] showed that heart rate also differed significantly (p 0.05) between the two groups during device insertion and removal, with an increase in both parameters that was seen in the ETT group. The disagreements between studies may be due to the difference in sample size and procedural data.

Measurements of $SpO_2$ and $EtCO_2$ taken at different periods showed no statistically significant difference between the two groups in the current study. In agreement with the current study **Janardhana and Thimmaiah** [18] revealed that that there was no significant difference between the studied groups regarding $SpO_2$ and $EtCO_2$ at all times of measurements. Also, according to **Elnakera *et al.*** [19]**,** from the pre-induction period until the device was removed, the mean $EtCO_2$ and $SpO_2$ in both groups B and E remained statistically non-significant (P > 0.05). Furthermore, **Shen *et al.*** [20] found that $SpO_2$ and $EtCO_2$ levels in the two groups were constant. Throughout the surgery, all patients' $SpO_2$ remained over 95% and their $EtCO_2$ stayed between 30 and 40 mmHg.

The current study showed that in comparison with the E group, BIS was much higher in the B group. Measurements were made at the beginning, following induction/before laryngoscopy, following laryngoscopy, during intubation/insertion, and at 1, 3, 5, 10, 20, 30, 40, 50, 60, 90 and 120 minutes, which is in agreement with **Moradian *et al.*** [21]**.** In agreement with the current study **Kang and Park** [22] revealed that In both groups, the BIS was kept below 60 at all times. When comparing data taken at 1 min after device insertion and 10 min after pneumoperitoneum beginning, BIS was considerably greater in the B group compared to the E group.

The present study demonstrated that there was no statistically significant difference between the two groups regarding tidal volume during every time of measurement. In agreement with the current study **Yamaguchi *et al.*** [23] revealed that there was no significant difference between the two studied groups regarding tidal volume at all times of measurements.

The study revealed a notable elevation in peak airway pressure within the E group across various time points, including measurements at baseline, after induction/before laryngoscopy, after laryngoscopy, during intubation/insertion, as well as at 1, 3, 5, 10, 20, 30, 40, 50, 60, 90, and 120 minutes. Our results are supported by **Ahn *et al.*** [6] who revealed that at 1 min after device installation and 10 min after pneumoperitoneum beginning, the peak airway pressure was considerably lower in the Baska mask group (P=0.006 and P=0.013, respectively). At any time point, the mean airway pressure did not significantly differ between the two groups. Also, **Sinasamy *et al.*** [24] revealed that Baska mask maintained a consistent oropharyngeal leak pressure of $\geq$ 33 $cmH_2O$ throughout the procedure with a much reduced peak airway pressure (p = 0.024).

The current research demonstrated that there was no statistically significant difference between the two groups in terms of the average airway pressure observed during every one of the measurements. In agreement with the current study **Zein *et al.*** [25] revealed that between the two studied groups, there

was no discernible change in mean airway pressure at any of the measurement periods. However, **El-Tawansy *et al.* [26]** revealed that at the 1st, 3rd, and 5th minutes of intubation, the mean airway pressure in E group was significantly greater than that in the B group.

In our study, it was observed that the leak pressure showed a statistically significant rise in the E group when compared to the B group across all times of measurements. In agreement with the current study, **Sidhu *et al.* [27]** revealed that at all time points under study, the Baska group had considerably reduced oropharyngeal leak pressure. Also, **Abdel-Ghaffar *et al.* [8]** revealed that the median leak pressure in the BASKA group was 32.0 (29-35) $cmH_2O$ at the time of insertion. This value was reduced during pneumoperitoneum expansion (31.0 [27-33] $cmH_2O$, P=0.000), and thereafter remained constant at this level (30.0 [27-32] cmH2O, P=0.000). Furthermore, **Choi *et al.* [28]** revealed that throughout the procedure, the Baska mask maintained a steady oropharyngeal leak pressure of $\geq 33$ $cmH_2O$.

The findings of the present study indicated that the average leak fraction was found to be significantly greater in the B group when compared to the E group, specifically in relation to measurements taken at 60, 90, and 120 minutes. In agreement with the current study **Ahn *et al.* [6]** revealed that at 1 min after pneumoperitoneum completion, the leak fraction was substantially greater in the Baska mask group than in the ET group (5.6% vs 2.1%, P=0.031). However, there were no other significant differences between the 2 groups at later measurement intervals.

While, **Demirgan *et al.* [29]** revealed that after insertion (P=0.012) and after the Trendelenburg position (P=0.032), the median leak % was greater in the Baska group, with no further significant differences.

The current study demonstrated a notable difference in insertion time between the groups under investigation. However, it was worth noting that anesthesia time, insufflation time, and removal time showed similar results across the studied groups. In consistency with the current study **Ahn *et al.* [6]** revealed that in comparison with the ETT group, the median insertion time was lower in the Baska group (21.0 [18-38] s, P=0.000) than in the latter (27.0 [24-33] s. Also, **Maged *et al.* [30]** reported that the device insertion time was greatly reduced by the Baska group (28.4±10.7 vs 46.6±19.8, P=0.001).

As well, **Yan *et al.* [31]** revealed that the Baska group needed less time to open an effective airway than the other group did (26.6±4.7 vs. 47.2±11.8 s; p<0.001), even though both groups' success rates for first-time insertion were ≥ 90%. Moreover, **Kumar *et al.* [32]** revealed that compared to group E, group B took much longer to establish the airway (45.3 ± 12.6 vs. 24.3 ± 9.1 sec). Furthermore, **Ng *et al.* [9]** reported that Baska mask insertion took an average of 12.8 ± 1.36 s, whereas ETT took an average of 15.93 ± 1.51 s. Baska mask insertion was simple in 85% of cases whereas ETT insertion was simple in 65% of cases. As well, **Tosh *et al.* [33]** reported that the average insertion time for Baska mask was 12.2 seconds, while for an ETT it was 19.4 seconds.

In relation to post-operative complications such as dysphagia, hoarseness of voice, and sore throat, the present study demonstrated a significant difference between the groups with respect to the occurrence of sore throat at 1 hour, 2 hours, and 4 hours following surgical procedure. However, there was no substantial difference between groups regarding the incidence of hoarseness of voice postoperatively. Additionally, it is important to note that there was a decrease in the occurrence of hoarseness of voice from 2 hours to 24 hours after the surgical procedure in group B. Similarly, in group E, there was a reduction in hoarseness of voice incidence from 8 hours to 24 hours postoperatively. There was no significant differences observed between groups in terms of dysphagia incidences following the surgery. Moreover, there was an increase in dysphagia incidence from 1 hour to 24 hours in both groups. This is consistent with the findings of **Tosh *et al.* [33]** who found no significant difference in postoperative hoarseness or dysphagia between the Baska and ET groups. Baska mask patients were more likely to experience postoperative sore throat than ET patients were (P=0.007). One hour and twenty-four hours following surgery, there was no difference in the prevalence of nausea and vomiting between the two groups (both P=1.000).

Also, **Ahn *et al.* [6]** reported that 9 individuals in the ETT group and three in the Baska group experienced a little sore throat. Additionally, 2 patients in the Baska group and 4 patients in the ETT group also had vomiting. There were no more issues found. In addition, **Rajan *et al.* [34]** showed that group ETT had a higher incidence of sore throat and coughing than group B at 1, 2, 4, 8, 12, and 24 hours postoperatively. At 1, 2, and 4 hours post-operative, more people in group ETT reported hoarseness than people in group B. Furthermore, **Tosh *et al.* [33]** discovered that the Baska mask had lower incidence of postoperative complications such as laryngospasm and throat discomfort compared to the ETT.

**Limitations:** Our study's limitations included a relatively small sample size. Referral bias is possible because the data came from just one facility. Patients weighing less than 30 kilograms (kg) and children cannot use a Baska mask because no pediatric size is currently available.

## CONCLUSION

Women undergoing elective laparoscopic gynecological surgery found that ventilation with the Baska mask was just as successful as endotracheal intubation while under general anesthesia. Similar

respiratory and hemodynamic responses to endotracheal intubation were seen, and few problems were linked to the use of the Baska mask in this study.


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- **Competing interests:** Nil.


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