

# COMPARATIVE STUDY BETWEEN THREE EXTRA-GLOTTIC AIRWAY DEVICES WITH GASTRIC ACCESS IN GENERAL SURGERY

By

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## ABSTRACT

**Background:** Extraglottic airway devices (EGADs) – synonyms may be supraglottic airway devices (SADs, SGAs) or supra-laryngeal airways (SLA), are an integral part of modern anesthetic practice. These devices are inserted into the oral cavity after induction to anesthesia and help to provide patent airways during surgery.

**Objective:** To compare the efficacy of three extra-glottic airway devices with gastric access tube namely: Proseal LMA, Air-Q, and Baska Mask in providing an adequate airway seal for general surgery in paralyzed patients with apparent normal airways, receiving controlled ventilation.

**Patients and Methods:** This study was carried out in Al-Azhar University Hospitals, designed prospective, randomized, single-blinded study, included 90 adult male and female patients with ASA physical status class I or II, aged 18 – 44 years who were scheduled to have elective surgeries under general anesthesia constituted the population of the present study. Inclusion criteria of this study obtained after approval of the Anesthesia Department's Research/Ethics Committee and written informed consents were obtained from the patients.

**Results:** As regard EGAD insertion, there were no cases of failed insertion of all airway devices. The Baska Mask was the easiest device to be inserted, while the PLMA was easier than Air Q. Both Baska Mask and PLMA showed a higher rate of insertion from first attempt than Air Q. The study showed that there was no need for repositioning or any manipulations of the device for optimization of ventilation in the Baska Mask group, while there was a need for optimizing the position in 6.7% and 13.3% in PLMA and Air Q groups, respectively. The duration of insertion in the Baska Mask group was the shortest among the three groups with significant difference compared with other two groups. The duration of insertion in PLMA group was shorter than Air Q group. Suprasternal notch test was done in both Baska Mask and PLMA groups only as the tip of NGT channel did not reach esophagus in the Air-Q group. There was a significant difference between PLMA and Baska Mask Groups ( $p=0.00$ ). The test was negative in 1 patient (3.3%) in PLMA group in contrast to 2 patients in Baska Mask group (6.7%). There was no major complication in all patients in all groups. There was neither vomiting nor hoarseness of voice in all groups. There was no displacement of any device in the Baska Mask group. In both Air Q and PLMA groups displacement occurred in (3.3%) of devices. The devices that stained with bloody sputum were (23.3%), (26.7%) and (6.7%) of devices in PLMA, Air Q, and Baska Mask groups, respectively. The patients who complained of sore throat after recovery were (16.7%), (23.3%) and (6.7%) in PLMA, Air Q, and Baska Mask groups, respectively.

**Conclusion:** Baska Mask was the easiest device to be inserted as it has the least insertion trials. PLMA was easier in insertion than the Air-Q as it has less insertion trials. Air-Q has the best glottic view through the FOB and higher seal pressure than Baska Mask.

**Keywords:** PLMA, Air-Q intubating laryngeal airway, Bask Amask air way, General surgery.

## INTRODUCTION

Extra-glottic airway devices (EGAD) are now widely used in Clinical Anaesthesia in General surgery. Some experts recommend using the devices with an incorporated additional channel for drainage or suctioning of gastric fluid in this instance (*Chen et al., 2013*).

The Proseal LMA (PLMA) (LMA North America, San Diego, CA) was introduced in 2000 as the first EGAD with two tubes for end-to-end contact with the respiratory and alimentary tracts (*Frek et al., 2015*). A drain tube in the PLMA separates the esophagus from the larynx. If the drainage tube is positioned correctly, it reduces the risk of aspiration if regurgitation occurs (*Wong et al., 2012*). A second cuff, behind the main body of the mask, increases contact with the posterior pharyngeal wall, increasing oropharyngeal leak pressure to an average of 25 cm H<sub>2</sub>O (*Qamarul Hoda et al., 2017*).

The Air-Q/Intubating Laryngeal Airway (ILA) was developed by Dr. Daniel Cook and introduced in 2004. The Air-Q/ILA (Cookgas LLC, St. Louis, MO, USA) is an extra-glottic airway device for use as a primary airway device or as an adjunct to tracheal intubation. The Air-Q/ILA is available as a disposable or non-disposable device. It has an elliptical, inflatable, cuffed mask and a slightly curved airway tube with a detachable connector (*Hernandez et al., 2012*).

Baska Mask, designed by Australian anesthetist Kanag and MeenaBaska, is provided in a single use and multi-use versions. The Baska Mask obviates the

need for orogastric tube and replaces this with a sump and two drains. The Baska Mask brings together features high seal pressure, gastric access part and bite block, which facilitate ventilation, provide air way protection and minimize air way obstruction respectively (*Sharma et al., 2017*).

**The aim of the present study was to** compare the efficacy of three extra-glottic airway devices with gastric access tube namely: Proseal LMA, Air-Q and Baska Mask in providing an adequate airway seal for general surgery in paralyzed patients with apparent normal airways, receiving controlled ventilation.

## PATIENTS AND METHODS

After obtaining approval of the Anesthesia Department's Research/Ethics Committee and written informed consents obtained from all patients, 90 adult male and female patients with ASA physical status class I or II, aged 18 – 44 years who were scheduled to have elective surgeries under general anesthesia constituted the population of the present study.

Patients were randomly divided into 3 equal groups according to EGAD used. **Group I:** ProSeal LMA (PLMA), **Group II:** (Air-Q), and **Group III:** Baska mask. The size of the EGAD was chosen in accordance to manufacturer's recommendations (*El-ganzouri et al., 2011*).

Pre-oxygenation was applied for 3 min using a facemask and oxygen 100%. When the oxyhemoglobin saturation reached 100%, and the expired oxygen concentration (EtO<sub>2</sub>) reached above 80%

anesthesia was induced by I.V. fentanyl (1µg/kg) and propofol (2 mg/kg). Patient's ventilation was then assisted using bag and mask before giving atracurium (0.5 mg/kg) to facilitate EGAD insertion. Thirty seconds after drug administration, the patient was manually ventilated by facemask with 100% oxygen and sevoflurane (4%).

The EGAD was inserted when the jaw became sufficiently slack and when TOF count became zero on the peripheral nerve stimulator assessed visually. Before placement, the EGA devices were tested for leaks and lubricated on the tip and posterior surface with water-soluble gel.

Airway seal pressure, grade of ease of EGAD insertion, number of attempts for EGAD insertion, duration of EGAD insertion, the ease of insertion of the EGAD, any maneuvers required to optimize positioning or ventilation, glottic view with the use of FOB, oxygenation quality, ease of gastric tube insertion Time to insertion of the gastric tube, hemodynamic response to EGAD insertion and complications, were assessed.

The calibration curves were obtained by plotting the absorbance readings (calculate the mean absorbance) of the standards (linear, y-axis) against the corresponding standard concentrations (logarithmic, x-axis).

#### **Statistical Analysis:**

Sample size calculation was based on previous studies, and concluded that 30 patients for each subgroup were sufficient to give  $\alpha = 0.05$  with confidence interval 95% and actual power 80% and  $\beta = 0.2$ , for airway seal pressure.

Data was collected, tabulated, coded then analyzed using SPSS<sup>®</sup> computer software version 15 for Windows. Firstly, numerical variables were presented as mean  $\pm$  standard deviation whenever appropriate. On the other hand, categorical variables were presented as number of cases (percent). For parametric data, one-way ANOVA was used to compare between the three groups. Tukey's post-hoc test was used for pair-wise comparisons when ANOVA test is significant. The significance level was set at  $P \leq 0.05$ .

## RESULTS

There were no statistically significant differences between the 3 groups of the study as regards their demographic data (age, height, weight, BMI, El-Ganzouri

Risk Index score) (**Table 2**) and Types of general surgeries were comparable between the three groups (**Table 1**).

**Table (1): Patient characteristics**

Parameters	Groups	PLMA	Air Q (n=30)	Baska Mask (n=30)	P value
		(n=30)			
Age (years)	Range	18 – 35	18 - 41	18 – 44	>0.05
	Mean ± SD	26.30 ± 4.58	28.72 ± 6.648	28.40 ± 6.089	
Weight (kg)	Mean ± SD	72.40 ± 4.399	72.80± 3.38	72.53± 4.321	>0.05
Height (m)	Mean ± SD	1.67±0.037	1.68±0.057	1.67±0.39	>0.05
BMI(kg/m <sup>2</sup> )	Mean ± SD	26.10 ± 1.373	26.03 ± 1.033	25.20 ± 1.448	>0.05
El-Ganzouri Score	0	13 (43.3%)	6 (20%)	9 (30%)	>0.05
	1	10 (33.3%)	14(46.7%)	15 (50%)	
	2	5(16.7%)	8 (26.7%)	5 (16.7%)	
	3	2 (6.7%)	2 (6.7%)	1 (3.3%)	

Data presented as (mean± SD) and n (%).

There was no failure in insertion of any device in all groups. Difficulty in insertion was encountered in 5/30 (16.6%) of Air-Q group in comparison to PLMA and Baska

Mask groups which showed difficulty in 2/30 (6.7%) and 1/30 (3.3%) respectively (**Table 2**).

**Table (2): Types of surgery**

Types of surgery	PLMA (n=30)	Air Q (n=30)	Baska Mask (n=30)	TOTAL
Inguinal Hernia	19 (63.3%)	18 (60%)	20(66.7%)	57(63.33%)
Umbilical Hernia	8 (26.7%)	9(30%)	5 (16.6%)	22 (24.22%)
Abdominal Lipoma	2(6.7%)	1 (3.3%)	2 (6.7%)	5(5.55%)
Varicocele	1 (3.3%)	2 (6.7%)	2 (6.7%)	5(5.55%)
Exploration	-	-	1 (3.3%)	1 (1.11%)
P Value		>0.05		

Data presented as n (%)

There was no failure in insertion of any device in all groups. Difficulty in insertion was encountered in 5/30 (16.6%) of Air-Q group in comparison to PLMA and Baska

Mask groups which showed difficulty in 2/30 (6.7%) and 1/30 (3.3%) respectively (**Table 3**).

**Table (3): Difficulty of EGAD insertion**

Parameters \ Groups	PLMA	Air Q	Baska Mask	P value
Easy	28 (93.3%)	25 (83.3%)	29 (96.6%)	>0.05
Difficult	2 (6.7%)	5 (16.6%)	1 (3.3%)	
Impossible	-	-	-	

Successful insertion from the first attempt was 28/30 (93.7%) in PLMA Mask group where it was 26/30 (86.7%) and 29/30 (96.7%), in Air Q groups and Baska group, respectively. From the second trial, successful insertion was 2/30

(6.7%) in PLMA Mask group while it was 3/30 (10%) and 1/30 (3.3%) in Air Q and Baska groups, respectively. Only one patient in the Air-Q group required insertion of the device from the third attempt 1/30 (3.3%) (**Table 4**).

**Table (4): Number of trials of EGAD insertion**

Parameters \ Groups	PLMA (n=30)	Air Q (n=30)	Baska Mask (n=30)	P value
1st trial	28 (93.3%)	26 (86.7%)	29 (96.7%)	>0.05
2nd trial	2 (6.7%)	3 (10%)	1 (3.3%)	
3rd trial	0	1(3.3%)	0	

Data presented as n (%).

There was no need for optimization of position or ventilation in Baska Mask group. While both PLMA and Air Q

groups required positioning adjustment in 2/30 (6.7%) and 4/30 (13.3%) patients, respectively (**Table 5**).

**Table (5): Maneuvers required to optimize positioning of EGAD**

Parameters \ Groups	PLMA (n=30)	Baska Mask (n=30)	P value
Yes	2 (6.7%)	4 (13.3%)	>0.05
No	28 (93.3%)	26 (86.7%)	

The duration of insertion in Baska Mask group was the shortest among the three studied groups ( $8.97 \pm 1.299$ sec) with significant difference compared to the other groups. Insertion duration in

PLMA group was significantly ( $p < 0.001$ ) shorter than that in Air Q group ( $14.43 \pm 1.794$ sec and  $17.63 \pm 1.938$ sec) respectively (**Table 6**).

**Table (6): Duration of insertion of EGAD**

Parameters \ Groups	PLMA (n=30)	Air Q (n=30)	Baska Mask (n=30)	P value
Duration of EGAD insertion (sec)	$14.43 \pm 1.794$	$17.63 \pm 1.938$	$8.97 \pm 1.299$	<0.001

Data were presented as Mean (SD) values, results of one-way ANOVA and Tukey's tests.

Different superscripts in the same row were statistically significantly different according to Tukey's test.

There was no significant difference between the 3 groups when MAP recorded at baseline, 1, 3 and 5 minutes after EGAD placement. At baseline MAP was ( $94.23 \pm 2.63$ ), ( $94.24 \pm 2.61$ ) and ( $95.86 \pm 7.83$ ) in PLMA, Air Q, and Basks groups, respectively. At 1st min after induction, it was ( $95.48 \pm 2.55$ ), ( $95.3 \pm 2.49$ ) and ( $94.96 \pm 2.96$ ) in in PLMA, Air

Q, and Basks groups, respectively. At 2nd min, it was ( $95.89 \pm 2.57$ ), ( $95.65 \pm 2.56$ ) and ( $94.48 \pm 3.23$ ) in in PLMA, Air Q, and Basks groups, respectively. At 3rd min, it was ( $94.13 \pm 2.86$ ), ( $94.2 \pm 2.57$ ) and ( $93.74 \pm 2.96$ ) in in PLMA, Air Q, and Basks groups, respectively as shown in (Table 7).

**Table (7): Mean blood pressure difference between the three groups**

Parameters \ Groups	PLMA (n=30)	Air Q (n=30)	Baska Mask (n=30)	P value
Baseline	$94.23 \pm 2.63$	$94.24 \pm 2.61$	$95.86 \pm 7.83$	>0.05
1st min	$95.48 \pm 2.55$	$95.3 \pm 2.49$	$94.96 \pm 2.96$	>0.05
2nd min	$95.89 \pm 2.57$	$95.65 \pm 2.56$	$94.48 \pm 3.23$	>0.05
3rd min	$94.13 \pm 2.86$	$94.2 \pm 2.57$	$93.74 \pm 2.96$	>0.05

Date presented as mean  $\pm$  SD

Full view of the vocal cords (score 1) was seen in 24 patients (80%) in PLMA group and in 25 patients in Air Q Group (83.4%) and in 20 patients (66.6%) in Baska Mask group. Partial view of the vocal cords including the arytenoids (score 2) was seen in 4 patients (13.3%) in

PLMA and Air Q groups; and in 7 Patients (23.3%) in Air Q group. View of the epiglottis only (score 3) was seen in 2 patients (6.7%), 1 patient (3.3%) and 3 patients (10%) in PLMA, Air Q, and Baska groups, respectively (Table 8).

**Table (8): Glottic view with the use of FBO**

Parameters \ Groups	PLMA (n=30)	Air Q (n=30)	Baska Mask (n=30)	P value
Score 1	24 (80%)	25 (83.4%)	20 (66.6%)	>0.05
Score 2	4 (13.3%)	4 (13.3%)	7 (23.3%)	
Score 3	2 (6.7%)	1 (3.3%)	3 (10%)	

Data presented as N (%)

Airway seal pressure showed a significant difference between the three groups. The highest seal pressure was recorded in Air Q group ( $29.79 \pm 2.49$ )

mmHg followed by PLMA group ( $29.39 \pm 1.96$ ) and the lowest seal pressure was recorded in Baska Mask group ( $27.19 \pm 1.90$ ) (Table 9).

**Table (9): Airway Seal Pressure**

Parameters \ Groups	PLMA (n=30)	Air Q (n=30)	Baska Mask (n=30)	P value
ASP	$29.39 \pm 1.96$	$29.79 \pm 2.49$	$27.19 \pm 1.90$	0.001

Data are presented as Mean  $\pm$  SD values, results of one-way ANOVA and Tukey's tests. Significant at  $P \leq 0.05$ , statistically significantly different according to Tukey's test.

There was no failure in insertion of NGT in all groups. Insertion was easy in 28/30 (93.3%) in PLMA group, 26/30 (86.7%) in Air Q group and in 29/30

(96.7%) in Baska Mask group. It was difficult in 2/30 (6.7%) in PLMA group, 4/30 (13.3%) in Air Q group and in 1/30 (3.3%) in Baska Mask group (**Table 10**).

**Table (10): Grade of difficulty of NGT insertion**

Parameters \ Groups	PLMA (n=30)	Air Q (n=30)	Baska Mask (n=30)	P value
Easy	28 (93.3%)	26 (86.7%)	29 (96.7%)	>0.05
Difficult	2 (6.7%)	4 (13.3%)	1 (3.3%)	
Impossible	-	-	-	

Data presented as N (%)

Successful NGT insertion from the first attempt was recorded in 28/30 (93.3%) of devices in PLMA group and in 26/30 (86.7%) of devices in Air Q group and in 29/30 (96.7%) of devices in Baska Mask

group. Second attempt was required in 2/30 (6.7%) of devices in PLMA group and in 4/30 (13.3%) of devices in Air Q group and in 1/30 (3.3%) of devices in Baska Mask group (**Table 11**).

**Table (11): Number of attempts of NGT insertion**

Parameters \ Groups	PLMA (n=30)	Air Q (n=30)	Baska Mask (n=30)	P value
1 <sup>st</sup> Attempt	28 (93.3%)	26 (86.7%)	29 (96.7%)	>0.05
2 <sup>nd</sup> Attempt	2 (6.7%)	4 (13.3%)	1 (3.3%)	

Data presented as N (%)

Stomach placement (positive test) was encountered with all devices in Baska mask and PLMA groups. Negative test

was recorded in 5/30 (16.7%) of cases in Air Q group (**Table 12**).

**Table (12): Confirmation of position of tip of NGT**

Parameters \ Groups	PLMA (n=30)	Air Q (n=30)	Baska Mask (n=30)	P value
Positive	30 (100%)	30 (100%)	25 (83.3%)	0.005
Negative	0	0	5 (16.7%)	

Data presented as N (%), result of Chi-Square Tests. Positive test = correct stomach placement Oxygenation

**Oxygenation quality:** Oxygen desaturation did not occur at any time during the procedure in all devices.

**Complications:** There was no major complication in all patients in all groups. However, the following problems have been encountered.

**Displacement of device:** There was no displacement of any device in Baska Mask

group. In both Air Q and PLMA groups displacement was encountered in 1/30 (3.3%) of devices.

**Obstruction:** There was no obstruction of any device in both Baska Mask and PLMA groups. In Air Q group obstruction was encountered in 2/30 (6.7%) of devices.

**Vomiting:** There was no vomiting noticed with any device in all groups.

**Blood tinged sputum on the device:** Bloody stained secretions were found on 7/30 (23.3%), 8/30 (26.7%) and 2/30 (6.7%) of devices in PLMA, Air Q, and Baska Mask groups, respectively.

**Sore throat:** Patients who complained from sore throat after recovery were 5/30 (16.7%), 7/30 (23.3%) and 2/30 (6.7%) in PLMA, Air Q, and Baska Mask groups, respectively.

**Hoarseness of voice:** Hoarseness of voice was not noticed with any device in all groups (**Table 13**).

**Table (13): Complications**

Parameters \ Groups	PLMA (n=30)	Air Q (n=30)	Baska Mask (n=30)	P value
Displacement	0	1 (3.3%)	1 (3.3%)	>0.05
Obstruction	0	0	2 (6.7%)	>0.05
Vomiting	0	0	0	>0.05
Blood tinged sputum	7 (23.3%)	8 (26.7%)	2 (6.7%)	>0.05
Sore throat	5 (16.7%)	7 (23.3%)	2(6.7%)	>0.05
Hoarseness of voice	0	0	0	>0.05

a: No statistics were computed because it is a constant.

## DISCUSSION

As regard the ease of insertion of EGAD, there were no cases of failed insertion of all airway devices i.e. 100% success rate in all groups. The Baska Mask was the easiest device to be inserted while the PLMA was easier than Air Q (*Al-rawahi et al., 2013*).

As regard the number of insertion attempts, both Baska Mask and PLMA showed a higher rate of insertion from first attempt than Air Q. The percentage of successful insertion from the first attempt in Baska Mask group was (96.7%) in comparison with PLMA and Air Q groups that were (93.3%) and (86.7%), respectively (*Galgon et al., 2011* and *Al-rawahi et al., 2013*).

In the Baska Mask group, there was no need for repositioning or any manipulations of the device for optimization of ventilation. As regard the other two groups, there was a need for

optimizing the position in 13.3% and 6.7% in PLMA and Air Q groups, respectively.

The duration of insertion in the Baska Mask group was the shortest among the three groups. The duration of insertion in PLMA group was shorter than Air Q group (*Galgon et al., 2011* and *Dhanasekaran et al., 2019*).

Suprasternal notch test was done in both Baska Mask and PLMA groups only as the tip of NGT channel did not reach esophagus in Air Q group.

Changes in hemodynamic parameters were noted at base line (one minute before induction of anesthesia) and at 1, 3, 5 minutes after device placement. As regard to pulse rate changes, there was no significant difference between the three groups at base line ( $75.43 \pm 3.28$ ), ( $73.86 \pm 3.50$ ) and ( $75.32 \pm 3.80$ ) in PLMA, Air Q, and Baska groups, respectively (*Attarde et al., 2016*).



As regard to systolic blood pressure, there was no significant difference between the 3 groups when SBP was recorded at baseline, 1, 3 and 5 minutes after EGAD placement. Diastolic blood pressure showed also no significant difference between the 3 groups when it measured at baseline, 1, 3 and 5 minutes after EGAD placement. As regard to mean arterial blood pressure (MAP), there was no significant difference between the 3 groups when MAP recorded at baseline, 1, 3 and 5 minutes after EGAD placement (*Kachakayala et al., 2019*).

Hemodynamic changes due to pressor response on EGAD insertion are less in Baska Mask than PLMA, Air Q and other cuffed EGADs which may be induced by the passage of the LMA through the oral and pharyngeal spaces, and pressure may be produced in the larynx and the pharynx by the inflated cuff and the dome of the LMA (*Jindal et al., 2019*).

As regard the glottic view by fiberoptic bronchoscope, the Air Q was the best device in showing the full view of vocal cords (score 1). Full view of the vocal cords (score 1) was seen in 80% in PLMA group, 83.4% in patients in Air Q Group, and 66.6% in Baska Mask group. Partial view of the vocal cords including the arytenoids (score 2) was seen in 13.3% in both PLMA and Air Q groups; and in 23.3% in Air Q group. View of the epiglottis only (score 3) was seen in 6.7%, 3.3% and 10% in PLMA, Air Q, and Baska groups, respectively. One of the most important parameters to be compared between the three devices was the airway seal pressure which was almost similar in both Air Q and PLMA ( $29.79 \pm 2.49$  and  $29.39 \pm 1.96$ ) mmHg,

respectively. Both had ASP more than Baska Mask which had seal pressure of  $27.19 \pm 1.90$  mmHg (*Galgon et al., 2011*).

NGT insertion through the gastric access was successful in all groups. Success of insertion from the first attempt was 93.3% in PLMA group, 86.7% in Air Q group and 96.7% in Baska Mask group. All NGTs in Baska Mask and PLMA groups were confirmed in the stomach. In the Air Q group (16.7%) had negative test. This may be due to the design of Air Q as the gastric access dose not reaches the tip of the device compared to the other two devices where the access reaches the tip of the cuff of the device. As regard oxygenation quality during procedure, the oxygen saturation did not affected at any time in the procedure in all devices. There was no major complication in all patients in all groups. There was neither vomiting nor hoarseness of voice in all groups (*Kachakayala et al., 2019*).

There was no displacement of any device in the Baska Mask group. In both Air Q and PLMA groups displacement occurred in 1/30 (3.3%) of devices. The devices that stained with bloody sputum were 7/30 (23.3%), 8/30 (26.7%) and 2/30 (6.7%) in PLMA, Air Q groups, and Baska Mask, respectively. The number of patients who complained of sore throat after recovery were 16.7%, 23.3%, and 6.7% in PLMA, Air Q groups, and Baska Mask groups, respectively (*Garpagalakshmi, 2019*).

## CONCLUSION

Baska Mask was the easiest device to be inserted as it has the least insertion trials, the shortest duration of insertion with no need for manipulations of the device for optimization of ventilation as

well as it has the least effect on hemodynamics. It has the least complications either intraoperative or postoperative. However, the Baska Mask has the lowest seal pressure and the least FOB view score among the three studied groups.

PLMA was easier in insertion than the Air-Q as it has less insertion trials, less need for manipulation for optimization of ventilation and shorter duration of insertion as well as easier NGT insertion. Also, it has less effect on hemodynamics with less complication either intraoperative or postoperative. Seal pressure is almost equal to that of Air-Q. It has less FOB view score than that of the Air-Q.

Air-Q has the best glottic view through the FOB, higher seal pressure than Baska Mask but with greater effect on hemodynamics and more complications than other studied devices.

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## دراسة مقارنة بين ثلاثة ممرات هوائية خارج الحنجرة وذو مدخل للمعدة في الجراحة العامه

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**خلفية البحث:** إن استخدام الممرات الهوائية خارج الحنجرة ذو مدخل للمعدة عند تخدير المرضى لإجراء العمليات الجراحية فى تزايد مستمر، فبالإضافة إلى سهولة إدراجها فى مكانها الصحيح وقدرتها على انشاء الضغط الكافى مع جدار البلعوم للحفاظ على تهوية كافية للرئة حتى فى الأوضاع المختلفة للمريض اثناء الجراحة، يعتبر انخفاض معدلات إعتلال المجرى الهوائى مقارنة بتنظير الحنجرة بالمنظار الحنجرى وتركيب الأنبوبة الحنجريّة من أفضل مميزات الممرات الهوائية خارج الحنجرة.

**الهدف من البحث:** لقد أجريت هذه الدراسة للمقارنة بين ثلاث ممرات هوائية خارج الحنجرة وذو مدخل للمعدة وهى قناع الحنجرة بروسيا والإير كيو والباسكا ماسك فى العمليات الجراحية.

**المرضى وطرق البحث:** قد أجريت الدراسة على تسعين مريض يخضعون لعمليات جراحية عامة بعد أخذ موافقتهم على إجراء الدراسة عليهم وأخذ موافقة لجنة الأخلاقيات والبحث العلمى، وتم تقسيمهم عشوائيا إلى ثلاث مجموعات متساوية كلا منها ثلاثون مريض موزعين كالتالى: المجموعة الأولى استخدم فيها قناع الحنجرة بروسيا والمجموعة الثانية استخدم فيها الإير كيو والمجموعة الثالثة استخدم فيها الباسكا ماسك كممرات هوائية.

**نتائج البحث:** لم تكن هناك محاولات إدراج فاشلة فى اي من الممرات الهوائية فى المجموعات الثلاث. وقد كان الباسكا ماسك هو الأسهل فى

إدراجه فى مكانه الصحيح، فى حين كان قناع الحنجرة بروسيل أسهل من الإيركيو. أظهر كلا من الباسكا ماسك و ماسك الحنجرة بروسيل ارتفاع معدل الإدراج الصحيح من المحاولة الأولى عن الإيركيو. كما أظهرت الدراسة أنه لم تكن هناك حاجة لإعادة تموضع أيا من الأجهزة فى مجموعة الباسكا ماسك فى حين كانت مطلوبة فى (٦,٧٪) و (١٣٣٪) فى مجموعات قناع الحنجرة بروسيل و الإيركيو، على التوالي. وكانت مدة الإدراج فى الباسكا ماسك هى الأقصر بين المجموعات الثلاث، تليها مجموعة قناع الحنجرة بروسيل والتي كانت أقصر من مجموعة الإيركيو. وقد تم عمل اختبار الشق فوق عظمة القص فى كل من مجموعتي الباسكا ماسك وقناع الحنجرة بروسيل فقط حيث أن تصميم جهاز الإيركيو لا يسمح بوصول قناة تصريف المعدة إلى فتحة المريء. كان هناك فرق ذات دلالة إحصائية بين مجموعة قناع الحنجرة بروسيل ومجموعة الباسكا ماسك، فكان الاختبار سلبيا فى مريض واحد (٣٣٪) فى مجموعة قناع الحنجرة بروسيل و اثنان من المرضى فى المجموعة الباسكا ماسك (٦,٧٪). أما بصدد إدراج الانبوبة المعدية من خلال فتحة الوصول إلى المعدة، كان ناجحا فى جميع المجموعات. وكان نجاح الإدراج من المحاولة الأولى (٣٩٣٪) فى مجموعة قناع الحنجرة بروسيل و (٧,٨٦٪) فى مجموعة الإيركيو و (٧,٩٦٪) فى مجموعة الباسكا ماسك.

لم تكن هناك مضاعفات خطيرة فى جميع المرضى فى كل المجموعات. لم يكن هناك قيء ولا بحة فى الصوت فى كل المجموعات. بالنسبة لإزاحة الجهاز من موضعه لم تكن هناك إزاحة لأي جهاز فى مجموعة الباسكا ماسك، لكنها حدثت فى كلا من مجموعتي الإيركيو و قناع الحنجرة بروسيل فى (٣٣٪) من الأجهزة. وكانت الأجهزة الملتصقة بإفرازات مدممه قد بلغت (٣٢٣٪) و (٧,٢٦٪) و (٧,٦٪) فى مجموعات قناع الحنجرة بروسيل والإيركيو و الباسكا ماسك، على التوالي. أما المرضى الذين اشتكو من التهاب فى الحلق بعد الإفاقة كن يشكلن نسبة

(١٦,٧٪)، (٣٠٢٣٪) و (٦,٧٪) في مجموعات قناع الحنجرة بروسيل و الإير كيو و الباسكا ماسك ، على التوالي.

**الاستنتاج:** نستنتج من هذه الدراسة أن الباسكا ماسك أفضل من الاجهزة الأخرى محل الدراسة من حيث سهولة الإدراج وقصر الوقت اللازم للإدراج وايضا من حيث التأثير على الجهاز الدوري وسهولة ادراج الأنبوية المعدية من خلاله وقلّة المضاعفات أثناء وبعد الجراحة. ونستنتج ايضا ان كلا من قناع الحنجرة بروسيل والإير كيو أفضل من الباسكا ماسك من حيث احتمال ضغطا للهواء في الجهاز التنفسي اكثر ارتفاعا قبل حدوث تسريب للهواء من حول الجهاز في البلعوم. وأعطى جهاز الإيركيو افضل رؤية لكامل الأحبال الصوتية ولكن مع نسبة مضاعفات اعلى من الأجهزة الأخرى.

**الكلمات الدالة:** قناع الحنجرة بروسيل, الإير كيو, الباسكا ماسك, العمليات الجراحية.