Comparison of Laryseal Pro and Ambu AuraGain in Elective Ophthalmic Surgeries

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Abstract:

Background: Ambu AuraGain is a widely accepted supraglottic airway device, whereas Laryseal™ Pro is a more recent addition to airway management options.

Objectives: This study aimed to evaluate and compare the performance of Laryseal™ Pro and Ambu AuraGain, specifically focusing on oropharyngeal leak pressure (OLP) and insertion success rate.

Patients and methods: Fifty-four adult patients were randomized into two equal groups: one receiving Laryseal™ Pro (L group) and the other Ambu AuraGain (A group). The primary endpoint was OLP five minutes post-insertion. Secondary measures included time required for insertion, success rate on first and second attempts, total number of insertion attempts, insertion ease score, OLP at subsequent time intervals (15, 30, 60 minutes), laryngeal view grading (based on Brimacombe and Berry scoring via flexible bronchoscopy), and incidence of postoperative complications such as sore throat, dysphagia, and blood-streaked secretions.

Results: OLP values at all time points were significantly higher in the Laryseal™ Pro group. Insertion time was shorter for the L group compared to the A group. Only 3.7% of patients in Group L required neck extension during insertion, in contrast to 96.2% in Group A, showing a statistically significant difference. Hemodynamic parameters remained comparable between groups. Grade 1 laryngeal view was observed in 59.3% of Group L and 44.4% of Group A, with no significant difference. Postoperative side effects were similar across both groups.

Conclusion: Laryseal™ Pro showed superior OLP and faster insertion compared to Ambu AuraGain, supporting its potential use as a reliable supraglottic airway in adult patients undergoing elective ophthalmic procedures under general anesthesia.

Keywords: Supraglottic airway devices; Oropharyngeal leak pressure; Airway management; Positive pressure ventilation.

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Introduction

Tracheal intubation remains the standard for definitive airway protection, yet extraglottic airway devices (EADs) have become a valuable alternative. Their design allows for blind Insertion without direct laryngoscopy, enabling continuous oxygenation and ventilation while minimizing hemodynamic stress and reducing postoperative complications (**Ahn et al., 2018)**.

EADs are particularly beneficial in settings where skilled airway management is limited. They are frequently employed by healthcare professionals who may lack advanced intubation training or in clinical scenarios where intubation is difficult or inadvisable **(Castillo-Monzón et al., 2023)**.

The Ambu AuraGain is a third-generation single-use laryngeal mask that features a gastric drainage port, compatibility with standard endotracheal tubes, and an anatomically curved shape to facilitate rapid and secure placement. Its thin, flexible cuff is capable of withstanding pressures up to 40 cmH_2O. Other practical features include an integrated bite block, size indicators, and navigation markings for bronchoscopy **(Ban et al., 2023)**. The device is available in sizes ranging from 1 to 6, accommodating patients of different body weights (size 3: 30–50 kg, size 4: 50–70 kg, size 5: 70–100 kg, and size 6: >100 kg). It is compatible with tracheal tubes ranging from 6.5 mm to 8 mm in diameter **(Sharma et al., 2017).**

The Laryseal™ Pro is a newer device designed to enhance safety and ease of use during airway management. Its preformed shape and integrated suction port reduce aspiration risk and assist in gastric content clearance. The symmetrical cuff and curved tube improve first-attempt success, and the device supports endotracheal intubation when needed. Additional features such as a guiding system, a fenestrated flap to prevent occlusion, and compatibility with standard suction catheters further enhance its clinical utility **(Abdelrahman et al., 2023).** The Laryseal™ Pro is available in clinical practice in sizes 1, 1.5, 2, 2.5, 3, 4, and 5, designed according to patient body weight: size 2: 20–30 kg, size 3: 30–50 kg, size 4: 50–70 kg, and size 5: 70–100 kg. It accommodates tracheal tubes with inner diameters of up to 7.5 mm and 8 mm, respectively, and a maximum suction catheter size of 16 Fr. **(Kriti, 2020).**

Both the Laryseal™ Pro and Ambu AuraGain include drainage channels and modified cuffs to improve sealing and facilitate gastric tube insertion, making them suitable for use with positive pressure ventilation **(Mendonca, 2019)**.

This study seeks to compare the Laryseal™ Pro and the Ambu AuraGain regarding airway seal quality and insertion success regarding airway seal quality and insertion succregarding airway seal quality and insertion succein adult patients scheduled for elective ophthalmic surgery under general anesthesia.

Patients and methods

This prospective, randomized controlled trial was carried out at Kasr Al-Ainy Hospital, Faculty of Medicine, Cairo University, Cairo, Egypt, following approval from the institutional Research Ethics Committee (Approval No.: MS-465-2023) and registration on ClinicalTrials.gov (Identifier: NCT06140667). All participants provided written informed consent prior to enrollment.

The study involved 54 adult patients (ASA physical status I or II) of both genders, all scheduled for elective ophthalmic procedures. Patients selected had an El-Ganzouri airway assessment score below 3. Individuals with coagulopathy, upper respiratory tract infections, obstructive sleep apnea, morbid obesity (BMI >40 kg/m^2), or pregnancy were excluded. Subjects were randomly allocated

into two equal groups: Group A, in which airway management was performed using Ambu AuraGain as shown in (**Fig.1**) **(Sharma et al., 2017),** and Group L, where Laryseal™ Pro was used as shown in (**Fig.2**) **(Kriti, 2020).**

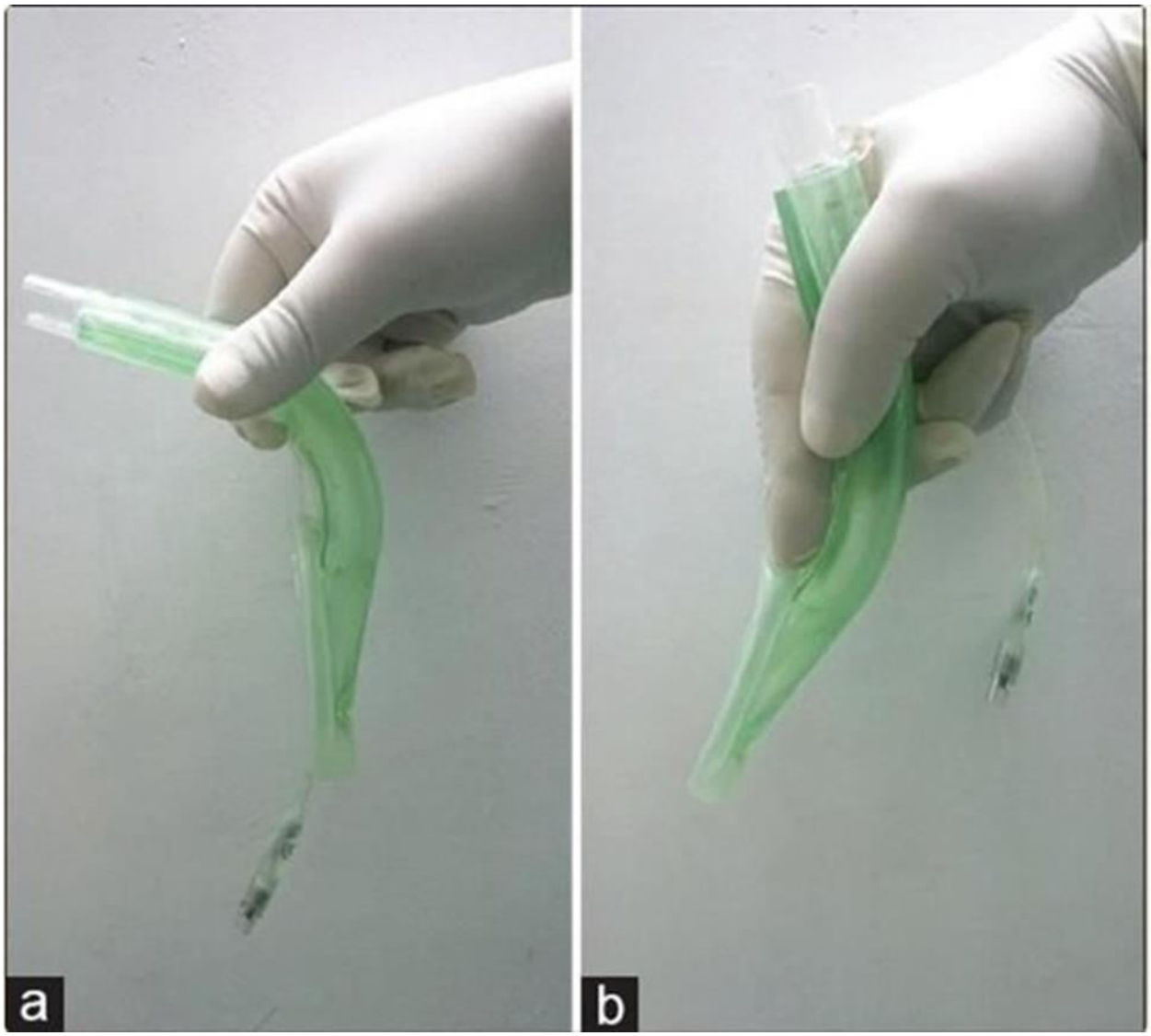

Fig.1. Ambu Aura Gain™ (a): The standard recommended insertion technique (b): The modified insertion technique

Fig.2. Laryseal Pro

Randomization was done using a computerized tool (http://www.randomizer.org) with a 1:1 ratio. Allocation concealment was maintained via sealed, opaque, sequentially numbered envelopes. The investigator responsible for randomization had no involvement in patient care or data collection.

Preoperative assessment included a full clinical evaluation, with a focus on airway, respiratory, and cardiovascular systems, as well as standard laboratory tests. All participants fasted for at least eight

hours preoperatively. Procedures included cataract extraction, glaucoma surgery, repair of a ruptured globe, and strabismus correction, typically lasting 60 to 90 minutes.

Standard intraoperative monitoring included non-invasive blood pressure, ECG, oxygen saturation, respiratory rate, temperature, and peripheral nerve stimulation. A peripheral IV line was established in a cephalic vein. Premedication included midazolam (0.01 mg/kg), atropine (0.2 mg), and metoclopramide (4 mg) administered IV. Ringer's lactate was infused at a slow rate to maintain line patency.

Anesthesia induction was achieved following three minutes of 100% oxygen preoxygenation via face mask. Fentanyl (1 µg/kg) and propofol (2 mg/kg) were used for induction, followed by atracurium (0.5 mg/kg) after confirming loss of consciousness. Isoflurane (1–1.2% end-tidal concentration) was used for maintenance.

After full neuromuscular blockade was confirmed (TOF = 0), the designated extraglottic airway device (EAD) was inserted, following lubrication and appropriate size selection per manufacturer instructions. Insertion time was recorded from face mask removal to confirmed device placement with ventilator connection.

Successful insertion was confirmed by: six consistent capnograph waveforms, bilateral breath sounds on auscultation, visible chest expansion, stable peak airway pressure (<20 cmH_2O), absence of air leak, and no gastric insufflation signs. In cases of suboptimal ventilation (e.g., $ETCO_2$ >50 mmHg, SpO_2 <92%, or tidal volume loss >20%), adjustments such as chin lift, jaw thrust, or head repositioning were attempted.

A failed insertion was defined as the inability to ventilate effectively after one attempt with appropriate adjustments. In such instances, the device was removed, and oxygenation was restored via face mask. A second attempt was allowed; failure on this second trial resulted in exclusion and conversion to endotracheal intubation with a fiber-optic bronchoscope. Such cases were excluded from the final analysis.

Device placement success (first and second attempts), total attempts, and ease of insertion were documented using a four-grade scale **(El-Ganzouri et al., 2012):** 3: First-attempt success without manipulations, 2: First-attempt success with adjustments, 1: Second-attempt success, 0: Failed insertion.

Volume-controlled ventilation was used with a tidal volume of 10 mL/kg, rate of 12 breaths/min, I:E ratio of 1:2.5, and fresh gas flow of 4 L/min. $ETCO_2$ was maintained within 30–40 cmH_2O. Anesthesia continued with isoflurane (1–2%) in 40% oxygen, along with boluses of atracurium (0.1 mg/kg every 20 minutes).

Oropharyngeal leak pressure (OLP) was measured five minutes post-insertion by closing the expiratory valve at 40 cmH_2O, stopping ventilation, and setting gas flow at 3 L/min. The anesthetist listened for a characteristic leak sound at the mouth while observing ventilator pressure. This was repeated at 15, 30, and 60 minutes.

Once the leak pressure was recorded, ventilation resumed, and the airway was re-evaluated. A flexible bronchoscope was passed through the EAD to visualize the laryngeal structures and assign a grade based on the Brimacombe and Berry score, as shown in (**Table.1)** (**Maha et al., 2014; Jagannathan et al., 2011; Brimacombe et al., 1993; Gasteiger et al., 2021)**.

Table 1. Laryngeal View Grades (LVG)

LVG	B&B	
1	**4**	Only the vocal cords are seen
2	**3**	The vocal cords and posterior surface of the epiglottis are seen
3	**2**	The vocal cords and the anterior tip of the epiglottis are seen
4	**1**	The anterior surface of the epiglottis is seen, therefore encroaching on The view of vocal cords obstructing <50% of the view
5	**0**	The epiglottis are completely obstructing the device opening, and no view was seen.

Final Procedures and Monitoring

Once the bronchoscope examination was completed, the device was withdrawn, and the patient was reconnected to the ventilator circuit. At this stage, the surgical team was cleared to initiate the ophthalmic procedure. Throughout the operation, hemodynamic variables were monitored at five-minute intervals, in accordance with standard ophthalmic anesthesia protocols. Fluid administration was tailored to each patient based on preoperative deficits, intraoperative losses, and maintenance requirements to preserve cardiovascular stability.

Upon completion of surgery, all anesthetic agents were stopped. Neuromuscular blockade was reversed with intravenous atropine (0.01 mg/kg) and neostigmine (0.05 mg/kg) to ensure full muscle strength recovery. The airway device was removed only after the patient demonstrated adequate spontaneous breathing, full consciousness, a train-of-four (TOF) ratio exceeding 99%, and the ability to respond to verbal stimuli such as eye opening. The presence of complications, such as blood-streaked secretions on the device, trauma to the teeth or oropharynx, hoarseness, or sore throat, was documented.

The primary outcome was OLP recorded 5 minutes after correct placement of the EAD. The secondary outcomes included insertion time of the EAD, success rate of first and second insertion attempts, total number of EAD insertion attempts, ease of EAD insertion score **(Elganzouri et al., 2012),** OLP at 15, 30, and 60 minutes after proper insertion, laryngeal view grade based on the Brimacombe and Berry Score using a flexible bronchoscope, postoperative complications, including blood-streaked mucus upon device removal (as an indicator of trauma), as well as sore throat or hoarseness, recorded at 1 and 4 hours postoperatively.

Sample Size Justification

Based on previous literature showing an average oropharyngeal leak pressure of 24 ± 6cmH_2O **(Zhang et al., 2024),** a sample size of 24 patients in each group was needed to detect a 5cmH_2O difference between groups with 80% power and a 5% significance level. The sample was increased to 27 per group to compensate for potential attrition. Calculations were conducted using MedCalc version 14.

Statistical Analysis

Data were analyzed using SPSS version 26 (IBM Corp., Chicago, IL, USA). Continuous variables were reported as means ± standard deviations (SD) and compared using the independent Student's t-test. Categorical variables were expressed as frequencies and percentages, and analyzed using the Chi-square test or Fisher's exact test where appropriate. A p-value < 0.05

(two-tailed) was considered statistically significant.

Results

Out of 67 patients initially screened for participation, eight did not meet the eligibility criteria and five declined to take part. The final 54 patients were randomly assigned into two groups of 27 each. All enrolled participants completed the study and were included in the final statistical analysis, as outlined in (**Fig.3).**

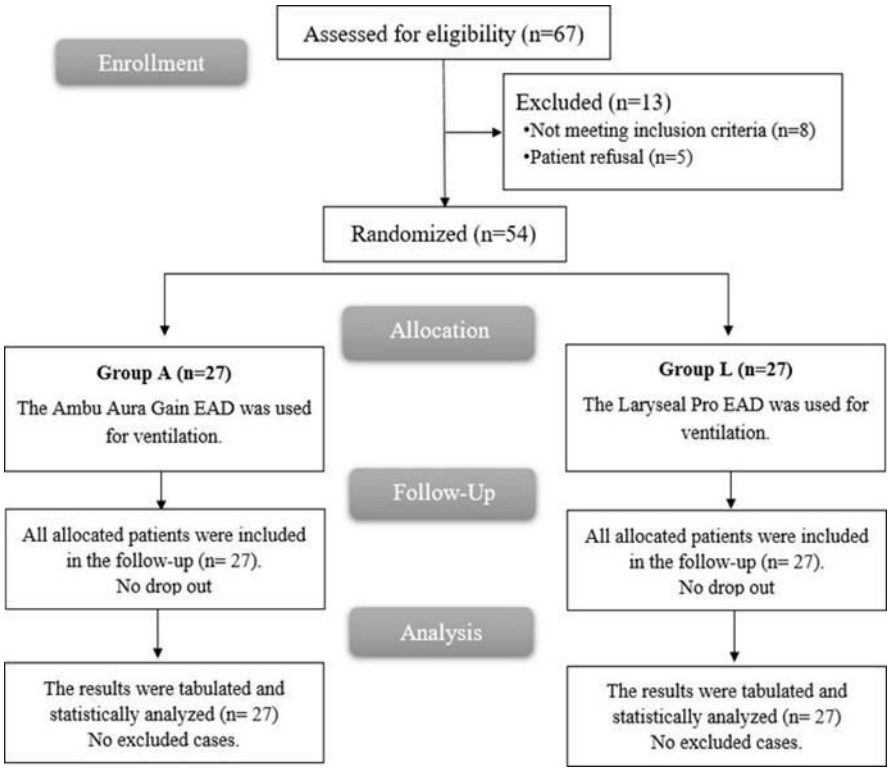

Fig.3. CONSORT Flowchart of the Enrolled Patients

(Table.2) shows no significant differences between the two groups regarding demographic parameters such as age, gender, body mass index (BMI), smoking habits, ASA physical classification, and Mallampati score. Notably, all patients had a Mallampati score of either 1 or 2; therefore, scores of 3 and 4 were not represented in this study.

Table 2. Demographic data of the Studied Groups

Demographic data	Group A (n=27)	Group L (n=27)	P value
Age (years)	34.7 ± 10.14	32.4 ± 10.35	0.407
Gender n (%) **Male** **Female**	 19 (70.4) 8 (29.6)	 12 (44.4) 15 (55.6)	0.054
BMI (Kg/m^2)	25.4 ± 4.78	26.4 ± 3.49	0.384
Smoking n (%) **Yes** **No**	 14 (51.9) 13 (48.1)	 9 (33.3) 18 (66.7)	0.169
ASA physical status n (%) **I**	 12 (44.4)	 19 (70.3)	0.054

II	15 (55.6)	8 (29.6)	
Mallampati score n (%) **Class I** **Class II**	 7 (25.9) 20 (74)	 14 (51.9) 13 (48.2)	0.051

Numerical data were expressed as Mean ± SD (Range) Categorical data were expressed as n (%) p value <0.05 is considered significant.

Group L demonstrated consistently higher oropharyngeal leak pressures at all measured time points compared to Group A. This difference was statistically significant ($p < 0.05$), as detailed in (**Table.3).**

Table 3. Oropharyngeal Seal Pressure (Cm H2O) of the studied groups

Variables	Group A (n=27)	Group L (n=27)	P value
5 min after proper positioning (primary outcome)	25.3 ± 2.05	31 ± 1.63*	**<0.001**
15min	25 ± 1.95	30.7 ± 1.77*	**<0.001**
30 min	25.1 ± 2.09	30.5 ± 1.93*	**<0.001**
60 min	25.5 ± 2.69	31.6 ± 2.34*	**<0.001**

Numerical data were expressed as Mean ± SD (Range) p value < 0.05 is considered significant

EAD Insertion Success

Successful first-attempt insertion occurred in 26 patients (96.3%) from Group L and 23 patients (85.2%) from Group A. The total number of attempts required to achieve successful placement was 28 in Group L and 31 in Group A However, this difference did not reach statistical significance (**p > 0.05**). An ease-of-insertion score of 3 (successful on first attempt without manipulation) was recorded in 25 patients (92.5%) from Group L, in contrast to just 1 patient (3.7%) in Group A. This outcome was statistically significant. The time required for device insertion was significantly shorter in Group L compared to Group A (**p < 0.05**) (**Table. 4)**.

Only one patient (3.7%) in Group L required neck extension during insertion, whereas 26 patients (96.2%) in Group A needed this maneuver. The difference was significant (**p < 0.001)**. According to the Brimacombe and Berry (B&B) grading system, Grade 1 visualization (score 4) was observed in 16 patients (59.3%) from Group L and in 12 patients (44.4%) from Group A. However, this difference was not statistically significant (**Table. 4)**.

Table 4. Secondary outcomes of the studied groups

Variables	Group A (n=27)	Group L (n=27)	P value
Number of attempts of EAD **First attempt** **Second attempt**	 23 (85.2) 4 (14.8)	 26 (96.3) 1 (3.7)	0.159
Total number of insertions attempts of EAD	31	28	----
Ease of EAD insertion score n (%)			
3	1 (3.7)	25 (92.5) *	**<0.001**
2	22(81.4)	1 (3.7)	
1	4(14.8)	1 (3.7)	
0	0 (0)	0 (0)	

Insertion time of EAD (sec)		45.74 ± 14.08	35.22 ± 5.39*	**<0.001**
Manipulation needed for Insertion.				
Neck extension n (%)				
Yes		26(96.2)	1 (3.7) *	
No		1(3.7)	26(96.2)	**<0.001**
LVG	**B&B**	**Laryngeal View Grades**		
1 (best view)	**4**	12 (44.4)	16 (59.3)	0.276
2	**3**	15 (55.6)	11 (40.7)	
3	**2**	0(0)	0(0)	
4	**1**	0(0)	0(0)	
5	**0**	0(0)	0(0)	

(3= insertion at first attempt without any manipulations/2= Insertion at first attempt with manipulations/1= Insertion successful at second attempt/ 0= insertion failed at second attempt. (Numerical data were expressed as Mean ± SD (Range). Categorical data were expressed as n (%) p value <0.05 is considered significant.

Systolic and diastolic blood pressure were comparable between Group L and Group A throughout the procedure. The heart rate values remained stable and showed no significant variation between the two groups throughout all recorded intervals. The oxygen saturation levels were consistent and comparable between both groups during all measured time points (**Table.5).**

Table 5. Systolic and diastolic blood pressure, heart rate and SpO_2 measurements of the studied groups

Variables	**Group A (n=27)**	**Group L (n=27)**	**P value**
Systolic blood pressure (mmHg)			
T0	137.5 ± 12.93	132 ± 9.96	0.087
T1	140.6 ± 12.41	136.8 ± 8.87	0.200
T2	135.6 ± 12.5	130 ± 9.47	0.071
Diastolic blood pressure (mmHg)			
T0	81.5 ± 7.69	80.4 ± 5.71	0.549
T1	84.6 ± 7.53	84.2 ± 5.52	0.838
T2	80.3 ± 7.28	79.1 ± 5.66	0.507
Heart rate (beat/min)			
T0	85.3 ± 7.36	84.4 ± 5.81	0.639
T1	86.3 ± 5.14	83.4 ± 7.02	0.087
T2	84 ± 5.16	80.9 ± 6.56	0.053
SpO_2 (%)			
T0	97.7 ± 0.81	97.9 ± 0.64	0.460
T1	98 ± 0.73	98.3 ± 0.54	0.097
T2	97.7 ± 0.81	97.9 ± 0.64	0.460

T0: 5 min after proper insertion T1: After 30 min after proper insertion, T2: After 1 hour after proper insertion. Numerical data were expressed as Mean ± SD. P value <0.05 is considered significant.

In terms of postoperative adverse events, a sore throat was noted in three patients (11.11%) in the Laryseal™ Pro group, whereas no such cases occurred in

the Ambu® AuraGain™ group. Dysphagia occurred in one patient (3.7%) from Group L and two patients (7.4%) from Group A. These variations were not statistically significant (**Table. 6).**

Table (6): Postoperative complications of the studied groups

Postoperative complications	Group A (n=27)	Group L (n=27)	P value
Sore throat	0 (0%)	3 (11.11%)	0.181
Dysphagia	2 (7.4%)	1 (3.7%)	
Blood streaked mucous	0 (0%)	0 (0%)	

Categorical data were expressed as n (%).

Discussion

Extraglottic airway devices (EADs) have revolutionized airway management. These devices, also known as supralaryngeal airways, are inserted orally with their distal ends positioned in the hypopharynx or esophagus. Designed according to the American Standards for Testing Materials, they facilitate the unobstructed passage of respiratory gases to the glottic inlet by displacing soft tissue and do not require an external facial seal to maintain airway patency **(Gómez-Ríos et al., 2022; Laurin et al., 2020)**. They are widely used for primary airway management and as a rescue ventilation option when face mask ventilation is challenging. Additionally, newly developed EADs can serve as conduits for endotracheal intubation **(Raj et al., 2024).**

The Ambu AuraGain™ (Ambu®, DK) is a disposable, preformed, second-generation EAD with integrated gastric access and intubation capability. The recently developed LarySeal Pro laryngeal mask provides rapid and secure airway management, enhancing patient safety with gastric access to reduce the risk of pulmonary aspiration. It also functions as a conduit for endotracheal intubation due to its uniquely designed guiding system (**Aravindan et al., 2022; Hell et al., 2021)**.

Oropharyngeal seal pressure is an important parameter in assessing the effectiveness of an EAD in sealing the upper airway. A low oropharyngeal seal pressure may indicate an incomplete mask seal, which can lead to air leakage and gastric insufflation. Gastric air insufflation increases the risk of gastroesophageal reflux and potential aspiration **(Hika et al., 2021).**

EADs are particularly useful in ophthalmic surgeries, as they help avoid increases in intraocular pressure that may occur during endotracheal intubation **(Abdelrahman et al., 2023).**

This study aimed to compare the Laryseal™ Pro and the Ambu® AuraGain™ in terms of oropharyngeal seal pressure and the success rate of insertion in adult patients undergoing elective ophthalmic surgery under general anesthesia.

The investigators enrolled 54 patients (aged 18–55 years) classified as ASA I & II of both genders, who were scheduled for elective ophthalmic surgery under general anesthesia. They compared the Ambu® AuraGain™ laryngeal mask (Group A) with the Laryseal™ Pro (Group L) regarding oropharyngeal seal pressure as the primary outcome. To the best of our knowledge, there is only one study in the literature on the Laryseal™ Pro laryngeal mask **(Abdelrahman et al., 2023).**

Our study revealed that oropharyngeal seal pressure was significantly higher in Group L (31 ± 1.63 cmH2O) than in Group A (25.3 ± 2.05 cmH2O) five minutes after proper insertion of the device (p-value < 0.05). Additionally, oropharyngeal seal pressure remained higher in Group L than in Group A at 15, 30, and

60 minutes after insertion. These results could be attributed to the distinctive design of the Laryseal™ Pro, which provides better sealing within the oropharynx compared to the Ambu® AuraGain™. Differences in cuff shape, material, and unique structural design may all contribute to improved sealing around the airway.

In agreement with our findings, the Laryseal™ Pro and the Air-Q® Blocker were compared for ventilation and blind intubation and their comparison reported an oropharyngeal seal pressure of 30.2 ± 0.88 cmH2O for the Laryseal™ Pro (**Abdelrahman et al., 2023).** A randomized clinical study was conducted on 80 ASA I & II patients (aged 18–65 years) undergoing laparoscopic surgery that were randomly assigned to one of two groups: the LMA® ProSeal™ group or the Ambu® AuraGain™ group, conclusively their findings demonstrated that the oropharyngeal seal pressure in the Ambu® AuraGain™ group was 25.71 ± 4.12 cmH2O, which is comparable to our results (**Manisha et al., 2022).**

Furthermore, a randomized controlled study on 100 spontaneously breathing anesthetized patients was conducted to compare the Ambu® AuraGain™ and the LMA® Supreme™. The investigators reported an oropharyngeal seal pressure of 24 cmH2O for the Ambu® AuraGain™ (**Shariffuddin et al., 2017).**

Moreover, a prospective observational study evaluating the clinical performance of the Ambu® AuraGain™ in 100 ASA I & II patients (aged 18–60 years) undergoing elective surgery under general anesthesia. Their findings indicated an oropharyngeal seal pressure of 24 cmH2O **(Devangi et al., 2017).**

In contrast to our study, an observational study was conducted on 250 adult ASA I–III patients who received general anesthesia with the Ambu® AuraGain™ LMA and reported an oropharyngeal seal pressure of 32 cmH2O, which may be attributed to differences in sample size (**Zaballos et al., 2021)**. Similarly, a randomized trial in 100 pediatric patients comparing the clinical performance of the Ambu® AuraGain™ and the LMA® Supreme™ for airway maintenance during mechanical ventilation. They found an oropharyngeal seal pressure of 19 cmH2O, likely due to differences in age groups **(Jagannathan et al., 2016)**.

Lastly, a randomized controlled trial comparing the Ambu® AuraGain™ and the I-gel® in pediatric patients aged 6 months to 6 years (weighing 5–20 kg) undergoing extremity surgery under general anesthesia with a total of 68 patients were enrolled and randomly allocated into two groups. The study found that the oropharyngeal seal pressure was 18.6 ± 4.2 cmH2O, which may again be attributed to differences in age groups **(Kim et al., 2019)**.

The investigators found that insertion time was shorter in Group L than in Group A (35.22 ± 5.39 seconds vs. 45.74 ± 14.08 seconds, respectively; $p < 0.05$). In agreement with our findings, it was reported an insertion time of 36.2 ± 5.5 seconds for the Laryseal Pro **(Abdelrahman et al., 2023).** However, in contrast to our results, it was recorded an insertion time of 33.4 seconds for the Ambu AuraGain **(Shariffuddin et al., 2017).** Furthermore, a randomized clinical study on 80 ASA I & II patients, aged 18-65 years, undergoing laparoscopic surgeries. The patients were randomly assigned to one of two groups: the Laryngeal Mask Airway (LMA) ® ProSeal™ group and the Ambu® AuraGain™ group. Their study demonstrated an insertion time of 28.34 ± 9.81 seconds in the Ambu AuraGain group, differing from our findings **(Manisha et al., 2022).**

Additionally, in contrast to our results, it was found that an insertion time of 13 seconds for the Ambu AuraGain group **(Jagannathan et al., 2016),** while it was recorded that an insertion time of 17 seconds **(Devangi et al., 2017).** It was documented that an insertion time of13.3 ± 3.7 seconds for the Ambu AuraGain **(Kim et al., 2019).** These discrepancies may be attributed to differences in methodology, patient populations, or required neck extension which was necessary for all patients in the Ambu AuraGain group in our study.

In this study, neck extension was required in only one patient (3.7%) in Group L, while it was necessary in 26 patients (96.2%) in Group A, a statistically significant difference ($p < 0.05$). In contrast, it was reported that manipulations were required in 61% of patients to facilitate the Insertion of Ambu AuraGain, which could be explained by differences in sample sizes **(Zaballos et al., 2021).** Conversely, it was found that no manipulations were needed to insert the Ambu AuraGain, likely due to differences in patient age groups **(Jagannathan et al., 2016).**

Successful first-attempt Insertion was achieved in 26 patients (96.3%) in Group L, compared to 23 patients (85.2%) in Group A, though the difference was not statistically significant ($p > 0.05$). Supporting our results, it was found that Ambu AuraGain was successfully inserted on the first attempt in 85% of patients **(Zaballos et al., 2021).** Similarly, it was reported a first-attempt success rate of 86% for Ambu AuraGain **(Shariffuddin et al., 2017).** However, it was found a lower success rate of 76%, which may be due to differences in patient age groups **(Jagannathan et al., 2016).** In contrast, it was reported a 100% first-attempt insertion rate for Ambu AuraGain, which may also be attributed to differences in age groups **(Kim et al., 2019).**

The Laryseal Pro was inserted on the first attempt without any manipulation in 25 patients (92.5%), whereas only 1 patient (3.7%) in Group A required no manipulation for Insertion, a statistically significant difference ($p < 0.05$). In contrast, it was found that Ambu AuraGain was easily inserted in 48% of patients **(Shariffuddin et al., 2017),** while it was reported that 76% of patients required no manipulation **(Jagannathan et al., 2016).** It was found that Ambu AuraGain was inserted without manipulation in 88% of patients **(Devangi et al., 2017).** These variations may be due to differences in patient age groups or clinical settings.

No statistically significant differences were observed in hemodynamic parameters between the two groups ($p > 0.05$). Consistent with our findings, it was reported minimal hemodynamic changes in the Laryseal Pro group **(Abdelrahman et al., 2023).** Additionally, there were no significant hemodynamic changes associated with the use of Ambu AuraGain **(Manisha et al., 2022; Devangi et al., 2017).**

Postoperative complications were also not significantly different between the two groups. Sore throat was reported in three patients (11.1%) in Group L, while no such complications were observed in Group A. Dysphagia was recorded in one patient (3.7%) in Group L and two patients (7.4%) in Group A. Neither group exhibited blood-streaked mucus upon device removal.

On the contrary, it was reported no postoperative complications in the Ambu AuraGain group, which was likely due to differences in age groups **(Jagannathan et al., 2016).** In contrast, it was found that sore throat occurred in 10% of patients and dysphagia in 6% of patients in the Ambu AuraGain group **(Shariffuddin et al., 2017).** Additionally, other investigators documented postoperative complications such as blood-streaked mucus in 15% of

Ambu AuraGain patients **(Zaballos et al., 2021).** Similarly, blood-streaked mucus was observed in 29% of patients **(Devangi et al., 2017)** compared to 14.7% in another study **(Kim et al., 2019).**These discrepancies from our findings are most likely attributable to differences in sample sizes.

Furthermore, sore throat was reported in 9.3% of patients, while dysphagia was noted in 6.25% of patients in the Laryseal Pro group, which may be influenced by the anesthetist's clinical practice **(Abdelrahman et al., 2023).**

In our study, Laryngeal View Grade 1 (B&B Score 4) was observed in 16 patients (59.3%) in Group L and 12 patients (44.4%) in Group A, which was statistically insignificant (p-value > 0.05). This aligns with another study which found that Laryngeal View Grade 1 was present in 48% of patients in the Ambu AuraGain group **(Jagannathan et al., 2016).** However, in contrast to our results, it was reported that the vocal cords (LVG1) were observed in 96.3% of Ambu AuraGain patients, possibly due to differences in age groups and sample sizes **(Zaballos et al., 2021).** Additionally, it was found that the Laryngeal View Grade 1 was recorded in 29% of patients in the Ambu AuraGain group **(Devangi et al., 2017),** while another study documented a rate of 35.3% **(Kim et al., 2019).** These variations are likely due to differences in patient age groups.

The limitations of this study included being conducted in a single center; limiting generalizability to other clinical settings. Measurement of OLP was occasionally hindered postoperatively due to the shared surgical field. All insertions were performed by a highly experienced anesthesiologist, potentially overestimating device success and underestimating complications. The relatively small sample size, lack of double-blinding, and strict inclusion criteria may also restrict broader applicability. Selection bias, publication bias, and limited demographic diversity (age, sex, comorbidities) are further limitations.

Conclusion

The Laryseal™ Pro demonstrated superior performance in OLP, ease, and insertion speed, and required fewer adjustments during placement compared to the Ambu® AuraGain™. These features make it a promising alternative for airway management in adult patients undergoing elective ophthalmic surgery.

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