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Scientific Research

Fiberoptic Intubation through Adapter Removable Supraglottic Airways; Comparison of the Air-Q ILA™, LMA Classic Excel™, and LMA Unique™

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Abstract

Study Objective: We studied the overall efficacy of fiberoptic aided intubation using three different supraglottic airways (SGA) as intubation conduits with a standard endotracheal tube (ETT) to determine which, if any, is superior as an intubation conduit. Design: After induction of general anesthesia, subjects were randomized to one of three groups: Air-Q ILA™, LMA Classic Excel™, and LMA Unique™. Subjects were intubated with a fiberoptic aided technique with continuous ventilation with $FiO_2 = 1.0$ through one of these SGAs. The primary endpoint was the overall efficacy of the intubation procedure. In addition, the following data were collected: demographic data, intubation times, grade of view of the larynx, and a visual analog scale (VAS) score of difficulty as determined by the primary anesthesiologist performing the procedure. Data were analyzed using a Kruskal-Wallis one-way analysis of variance and Post hoc analysis was done using Dunn's Multiple Comparison Test. Results: 126 total subjects were studied. Intubation success rates were 100%, 87.8%, and 95% with the Air-Q ILA™, LMA Classic Excel™, and LMA Unique™ respectively. There was no significant difference among the three different SGAs when comparing the times to place the SGA (T1), the true intubating time (T2), the time to remove the SGA (T3), or the total time (T4). Data were also stratified by the grade of view of the larynx; all grade I views, grade II views, and grade III views were grouped together regardless of the type of the SGA used. The grade I view of the larynx group had significantly faster true intubation times (T2 = 75.1 sec, p = 0.01) and significantly lower VAS scores (VAS = 1.9, P = < 0.0001) when compared to both the grade II views (T2= 92.7 sec, VAS = 3.2) and grade III views (T2 = 111.6 sec, VAS = 4.9). Conclusions: We conclude that the Air-Q ILA™ provides the best view of the larynx and is the easiest one to use as an intubation conduit.

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Keywords

Fiberoptic Intubation, Laryngeal Mask Airway, Supraglottic Airway

1. Introduction

Since the inception of the laryngeal mask airway (LMA) by Dr. Brain in 1981, supraglottic airways (SGAs) have been integral to patient airway management throughout the world. Not only are SGAs useful for operations that do not require an endotracheal tube (ETT), but they have become a mainstay in the management of the difficult airway [1]. With the patent expiration of the LMA Classic™ in 2003, multiple SGA producers have entered the SGA market using the LMA Classic™ (LMA North America) design. More than 30 different SGAs each with their own specific attributes were described in a recent edition of Anesthesiology News [2]. Although any of these could be used to establish ventilation in a rescue "cannot ventilate situation", not all SGAs are suitable as an intubation conduit for a standard size ETT. The difficulties in intubating through the LMA Classic™ with a fiberoptic bronchoscope (FOB) have been well-described [1] [3]. The 15 mm adapter of the LMA Classic™ is not removable and the breathing shaft of the Classic LMA™ is long; these two features result in the requirement that 1) a long ETT be used (e.g. nasotracheal tube); 2) a small internal diameter ETT be used; and 3) the SGA can not be easily removed without the risk of tracheal extubation. These three disadvantages reduce the clinical usefulness of the LMA Classic™ as an intubation conduit. A few of the newly designed SGAs have circumvented the handicaps of the LMA Classic™ either with removable adapters, or by eliminating the adapter entirely. These SGAs include the Cook Gas Air-Q Intubating Laryngeal Airway™ (Air-Q ILA™), (Mercury Medical), LMA Classic Excel™ (LMA North America), and the LMA Unique™ (LMA North America) (**Figure 1**). The Air-Q ILA™ and LMA Classic Excel™ are SGAs specifically designed as intubation conduits. Both of them have shorter breathing shafts and removable adapters, allowing them to overcome the handicaps of the LMA Classic™ as an intubation conduit. The LMA Unique™ is the disposable form of the LMA Classic™. It suffers from the same limitations as the LMA Classic™ when serving as an intubation conduit. However, because it is disposable, the adapter can easily be removed with trauma shears, giving it a shorter breathing shaft. Although the LMA Unique™ is not specifically designed as an intubation conduit we include it here because it is so widely used and available in clinical practice and easily converted to an adapter less SGA. We studied the overall efficacy of fiberoptic intubation through these three SGAs using a standard size ETT to determine which, if any, is superior as an intubation conduit.

2. Methods

The study was approved by the appropriate IRB and written informed consent was obtained from all subjects. Inclusion criteria consisted of adult patients who required general anesthesia and tracheal intubation for scheduled elective surgery. 126 subjects were enrolled in the study whenever one of the authors was available to do the case with an anesthesia resident. Anesthesia residents performing the intubation procedure were senior residents on their Airway Rotation and had extensive experience with the fiberoptic bronchoscope and intubating through all three of the SGAs studied here. Exclusion criteria consisted of age < 18 years, emergency surgery, suspected or known difficult airways based on clinical history and an 11-point airway exam, anatomical or pathological contraindications to SGA insertion, significant aspiration risk, or unstable cervical spines.

All subjects received midazolam or fentanyl preinduction as clinically indicated. Subjects were preoxygenated with $FiO_2 = 1.0$ for five minutes to achieve $F_{ET}O_2 > 0.9$. Subjects were then induced intravenously with 1.0 mg/kg lidocaine and 2.0 mg/kg propofol. Following induction of anesthesia, adequate ventilation via mask with clinically indicated Sevoflorane in O_2 was confirmed prior to the administration of 0.6 mg/kg rocuronium. Subjects were then randomized to one of three SGAs by blinded selection from a choice container. After achieving adequate muscle relaxation as assessed by loss of twitches by nerve stimulator, subjects had one of three SGAs (Air-Q ILA™, LMA Classic Excel™, or the LMA Unique™) (see **Figure 1**) placed. Ventilation was assessed by the presence of chest rise with 20 cm H_2O positive pressure and the absence of an audible air leak. If ventilation was not adequate despite two attempts at placing the SGA, the procedure was aborted and the patient was intubated with direct laryngoscopy. If ventilation through the SGA was deemed adequate the investigator pro-

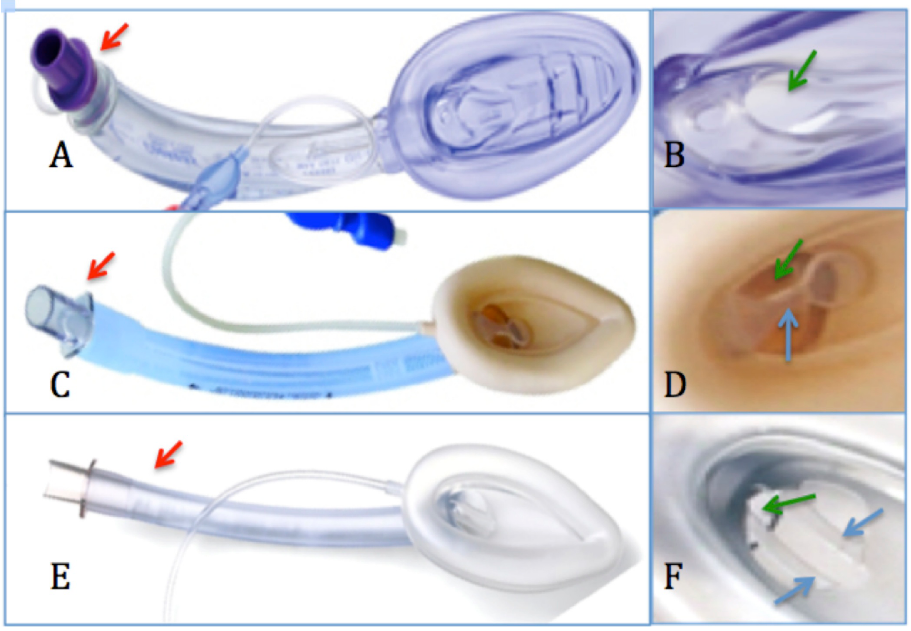

Figure 1. Close up of the Air-Q ILA™, LMA Classic Excel™, and LMA Unique™ supraglottic airways. 1) Air-Q ILA™. Red Arrow in (A) denotes removable adapter; 2) Close up of Air-Q ILA™. Green arrow in (B) denotes the distal end of the breathing shaft of the Air-Q ILA™; 3) LMA Classic Excel™. Red Arrow in (C) denotes removable adapter; 4) Close up of LMA Classic Excel™. Blue arrow in (D) denotes the neck of the epiglottic elevating bar, the green arrow denotes the distal end of the breathing shaft of the LMA Classic Excel™; 5) LMA Unique™. Red Arrow in (E) denotes where the adapter would be cut to make the LMA Unique™ adapter less; 6) Close up of LMA Unique™. Blue arrows in (F) denote aperture bars; green arrow denotes the distal end of the breathing shaft of the LMA Unique™; 7) *If the intubation procedure is unsuccessful, the cut LMA Unique™ can still be used as a supraglottic ventilation device by inserting an appropriate sized ETT into the breathing shaft of the LMA Unique™ or a universal airway adapter (Tibble Cap™, LMA North America).

ceeded with intubation by one of the three protocols listed below.

Air-Q ILA™: A bronchoscopy adapter was connected to the Air-Q ILA™ and attached to the breathing circuit. The FOB (Olympus BF Type 40) was then introduced to confirm proper placement and grade the view of the larynx ("scouting view"). The FOB was then removed along with the FOB adapter and Air-Q ILA™ adapter. A standard size lubricated ETT was inserted through the Air-Q ILA™ until the tip of the ETT was at the opening of the bowl of the Air-Q ILA™ (16 cm mark of the ETT at the adaptor less breathing shaft of the Air-Q ILA™). An 8.0 mm ID ETT was used with a #4.5 Air-Q ILA™ (for males) and a 7.0 mm ID ETT was used with a #3.5 Air-Q ILA™ (for females). A bronchoscopy adapter was then attached to the ETT and ventilation was resumed with clinically indicated Sevoflorane in O_2 and pressure control with peak inspiratory pressure set to 18 cm H_2O and a respiratory rate of 15 - 18 breaths/min. The FOB was introduced through the bronchoscopy adapter and advanced through the glottis to the level of the carina. The ETT was then passed over the FOB, through the glottis and into the trachea. Correct tracheal position was confirmed during withdrawal of the FOB. The breathing circuit was disconnected and a Removal Stylet™ (Mercury Medical) was used to maintain the position of the ETT while removing the Air-Q ILA™. After removal of the Air-Q ILA™, the ETT was reconnected to the breathing circuit. Figure 2 describes and illustrates the intubation procedure in detail.

LMA Classic Excel™: The method of the FOB assisted intubation was the same through the LMA Classic Excel™ as for the Air-Q ILA™ except an 8.0 mm ID ETT was used with a #5 LMA Classic Excel™ (for males) and a 7.0 mm ID ETT was used with a #4 LMA Classic Excel™ (for females). For both the #4 and #5 Classic Excel LMA™ the FOB had to be maneuvered around the epiglottic elevating bar prior to entering the glottis.

LMA Unique™: A bronchoscopy adapter was connected to the LMA Unique™ and attached to the breathing circuit. The FOB was then introduced to confirm proper placement and grade the view of the larynx. The FOB

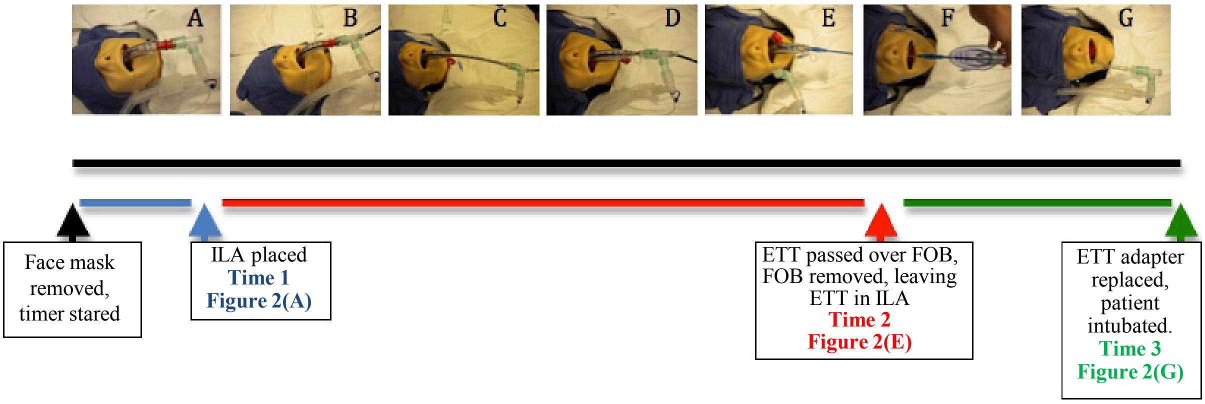

Figure 2. Schematic of fiberoptic aided tracheal intubation through an Air-Q ILA™ with continuous ventilation with FiO_2 = 1.0. (A): Air-Q ILA™ placed, connected to anesthesia circle system with bronchoscopy elbow. (B): "Scouting" view of the larynx, continuous ventilation with FiO_2 = 1.0 maintained. (C): Air-Q ILA™ adapter removed, ETT placed inside of Air-Q ILA™ to depth of 16 cm, anesthesia circle system attached to ETT, continuous ventilation with FiO_2 = 1.0 maintained. (D): FOB advanced to carina, ETT passed over FOB. (E) and (F): Circuit is broken at ETT adapter. ILA Removal Stylet used to maintain ETT in place while Air-Q ILA™ is removed. (G): Anesthesia circle system reconnected. *See Methods for Definitions of Times 1, 2, and 3.

was then removed along with the FOB adapter. The LMA Unique™ was then cut 2 cm below the distal end of the LMA Unique™ adaptor with trauma shears to remove the 15 mm adapter. A standard size lubricated endotracheal tube (ETT) was inserted through the LMA Unique™ until the tip of the ETT was at the bowl of the LMA Unique™ (16 cm mark of the ETT at the adaptor less breathing shaft of the LMA Unique™). A 7.0 mm ID ETT was used with a #5 LMA Unique™ (for males) and a 6.0 mm ID ETT was used with a #4 LMA Unique™ (for females). The rest of the FOB assisted intubation was the same as with the Air-Q ILA™ and LMA Classic Excel™, except the FOB was advanced through the middle compartment of the LMA Unique™ aperture bars, through the glottis to the level of the carina.

The following data were collected: demographic data, baseline (end preoxygenation) SpO_2, lowest SpO_2 during the intubation procedure, number of attempts to properly insert the SGA, and the grade of the fiberoptic view of the larynx. The view of the larynx was graded as follows: Grade I = full view of the vocal cords; Grade II = vocal cords partially obscured by something (epiglottis, aperture bars or epiglottis-elevating bar); but easily bypassed so that the vocal cords could be fully visualized; Grade III = vocal cords completely obscured by something (epiglottis, aperture bars or epiglottis-elevating bar) but easily bypassed by the FOB so that vocal cords could be fully visualized; and Grade IV = vocal cords completely obscured by something, which could not be bypassed by the FOB, and the vocal cords could not be visualized. In addition, the following times were recorded (see **Figure 2**): the time from removal of the face mask to obtaining end-tidal CO_2 from the SGA (time 1 [T1], time to place the SGA); the time from obtaining end-tidal CO_2 from the SGA to obtaining end-tidal CO_2 from the ETT while the SGA is still in place (time 2 [T2], true intubating time); and the time from obtaining end-tidal CO_2 from the ETT with the SGA in place to end-tidal CO_2 from the ETT with the SGA removed (time 3 [T3], time to remove the SGA). At the conclusion of the intubation procedure, the anesthesia resident was asked to rate the difficulty of the procedure on a visual analog scale (VAS) (1 = easy, 10 = hard/impossible). Finally, the incidence of airway trauma including bleeding or swelling to the lips, tongue, teeth, oropharyngeal mucosa, or the larynx was noted.

The criteria to abort the intubation procedure included any evidence of trauma (bleeding or swelling) to the lips, tongue, teeth, oropharyngeal mucosa, or the larynx, or oxygen desaturation by more than 5% (as compared to the baseline saturation value of the patient while preoxygenating with FiO_2 = 1.0).

3. Statistical Analysis

The study was powered to detect a difference in true intubating time (Time 2) of greater than 30 seconds as 30 seconds was felt to be clinically significant during the management of difficult airways. A one way Analysis of Variance (ANOVA) was used to detect differences among groups for demographic data (age and BMI). A

Kruskal-Wallis one-way analysis of variance was used to detect differences in all intubation times, VAS scores, grade of view of the larynx, Mallampati score, and ASA classification since all of these metrics did not follow a Gaussian distribution curve and were therefore deemed nonparametric data. If the Kruskal-Wallis test yielded a P value < 0.05, post hoc analysis was done using Dunn's Multiple Comparison Test. Finally, a two-tailed Chi-squared test was used to determine the significance of intubation success rates between the Air-Q ILA™, LMA Classic Excel™, and the LMA Unique™ and between intubation success rates with differing grade of views of the larynx. Intubation failures were not included in the calculations of the descriptive statistics of the intubation times (T1, T2, T3, T4), VAS scores, or grade of view of the larynx.

4. Results

126 subjects were enrolled in the study. 45, 41, and 40 intubations were performed by 19, 17, and 18 intubators in the Air-Q ILA™, LMA Classic Excel™, and the LMA Unique™ groups respectively. There were no differences in demographic data among the Air-Q ILA™, LMA Classic Excel™, and the LMA Unique™ groups (**Table 1**). There was no significant difference among the three different SGAs when comparing the time to place the SGA (T1), the true intubating time (T2), the time to remove the SGA (T3), or the total time (T4) (**Table 2**). There was a significant difference between the Air-Q ILA™ group when compared to both the LMA Unique™ and the LMA Classic Excel™ in terms of VAS scores and mean grade of view of the larynx (**Table 2**). The intubation success rate was significantly better ($p = 0.02$) for the Air-Q ILA™ (100%) compared to the LMA Classic Excel™ (87.8%).

Data were also stratified by the grade of view of the larynx; all grade I views, grade II views, and grade III views were grouped together regardless of the type of SGA used (**Table 3**). There were no demographic differences among the grade I view, grade II view, and grade III view groups (data not shown). The grade I view of the larynx group had significantly faster true intubation times (T2 = 75.1 sec, $p = 0.01$) and significantly lower VAS scores (VAS = 1.9, $P \leq 0.0001$) when compared to both the grade II view (T2 = 92.7 sec, VAS = 3.2) and grade III view groups (T2 = 111.6, VAS = 4.9) (**Table 3**).

There were 7 intubation failures; five were with the LMA Classic Excel™ and two were with the LMA Unique™. Two of the failures with the LMA Classic Excel™ were due to grade IV views of the larynx where the glottis could not be viewed with the FOB. In both of these failures, corrective measures were attempted to improve the laryngeal view with the SGA (LMA Classic Excel™) but both times corrective measures were unsuccessful. Four additional intubation failures were due to the inability to pass the ETT into the trachea despite three attempts at "corkscrewing" the ETT through the glottis; three of these occurred with the LMA Classic Excel™ and one of these occurred with the LMA Unique™. Finally, there was one failure where the patient was extubated during removal of the SGA (LMA Unique™). None of the 126 intubation procedures caused significant trauma, no case was aborted for oxygen desaturation, and no case required corrective maneuvers upon initial placement of the SGA to establish adequate ventilation.

5. Discussion

Before describing the clinical implications of this study, its limitations should first be addressed. The sample size of each group in this observational study was small (N approximately = 40) and thus the study may be underpowered to detect the true incidence of intubation failures with this technique. Intubating times vary widely which are most likely reflective of having a number of different intubators with different levels of skill. However, each intubator did have 1 - 3 intubations with each of the three supraglottic airways. In addition, although all intubators were told they would be timed, it was obvious that there were some differences in the dexterity of the intubators. All patients had normal airways and thus results may not be applicable in those patients with pathological contraindications to SGA insertion or those with a soiled airway (significant bleeding, vomiting, pulmonary edema froth, or pus). However, the results of this study can be extrapolated to any patients who cannot be intubated via direct laryngoscopy and to whom an SGA can be placed correctly. Our technique requires a fiberoptic view of the larynx from the distal end of the SGA and a view that is obtained in many patients with difficult airways. Lastly, all of our intubators were very experienced with the fiberoptic bronchoscope; longer intubation times and higher VAS scores may be expected with intubators completely naive to the technique used here. We believe all measurements were accurate and not a source of limitation to the study.

Despite the lack of statistically significant differences in intubation times reported here, we believe the results

Table 1. Demographic and descriptive data regarding fiberoptic aided tracheal intubation through the Air-Q ILA™, LMA Classic Excel™, and LMA Unique™.

Characteristic	Air-Q ILA™	LMA Classic Excel™	LMA Unique™	P Value
Number of subjects	45	41	40	N/A
Number of Intubators	19	17	18	N/A
Age in Years	48.4, +/− 14.6, (21 - 78)	52.0, +/− 15.5, (19 - 83)	50.7, +/− 16.6, (19 - 87)	P = 0.55
BMI	30.1, +/− 6.8, (19.7 - 49.2)	29.2, +/− 7.0, (17.3 - 57.7)	27.5, +/− 4.1, (19.1 - 37.2)	P = 0.14
ASA Physical Status	2.3, +/− 0.7, (1 - 3)	2.5, +/− 0.6, (1 - 3)	2.4, +/− 0.6, (1 - 3)	P = 0.38
Mallampati	1.8, +/− 0.6, (1 - 4)	1.9, +/− 0.6, (1 - 4)	1.8, +/− 0.6, (1 - 3)	P = 0.65

All data expressed as mean, +/−S.D., (range) unless otherwise indicated.

Table 2. Results stratified by SGA Type.

Parameter	Air-Q ILA™	LMA Classic Excel™	LMA Unique™	Significance statistic (P)
Grade of View of the Larynx	Mean: 1.29 Median: 1 IQR: (1 - 1.5)	Mean: 2.34 Median: 2 IQR: (2 - 3)	Mean 2.28 Median: 2 IQR: (2 - 3)	**P < 0.05**
Post Hoc Analysis (Dunn's Multiple Comparison Test)	Air-Q vs Excel **P < 0.001**	Excel vs Unique P > 0.05	Unique vs Air-Q **P < 0.001**	
Time 1 in seconds—(time it takes to place the SGA)	Mean: 30.6 Median: 25 IQR: (21 - 37)	Mean 37.9 Median: 25 IQR: (22.5 - 40)	Mean: 32.5 Median: 28.5 IQR: (21 - 36.5)	P = 0.59
Time 2 in seconds—(true intubation time)	Mean: 81.6 Median: 75 IQR: (53 - 103)	Mean: 93.4 Median: 87.5 IQR: (59.5 - 116)	Mean: 90.8 Median: 73 IQR: (55 - 125)	P = 0.45
Time 3 in seconds—(time it takes to remove SGA)	Mean: 37.5 Median: 32 IQR: (22.5 - 53.5)	Mean: 37.3 Median: 32 IQR: (24.5 - 45.5)	Mean: 39.2 Median: 36 IQR: (23.5 - 49)	P = 0.78
Time 4 in seconds—Total Time of procedure (T1 + T2 + T3)	Mean: 149.7 Median: 143 IQR:(105 - 176)	Mean: 168.4 Median: 163.5 IQR: (118 - 194)	Mean: 168.3 Median: 157.5 IQR: (123 - 201)	P = 0.39
Visual Analog Scale (VAS)	Mean: 2.3 Median: 2 IQR: (1 - 3)	Mean: 3.5 Median: 3 IQR: (3 - 5)	Mean: 3.8 Median: 4 IQR: (2 - 5)	**P < 0.05**
Post Hoc Analysis (Dunn's Multiple Comparison Test)	Air-Q vs Excel P < 0.001	Excel vs Unique P > 0.05	Unique vs Air-Q P < 0.001	**P < 0.05**
Intubation success rate # Success/# Total, %	45/45, 100%	36/41, 87.8%	38/40, 95%	**P = 0.047**
Post Hoc Analysis (Chi-Squared)	Air-Q vs Excel P = 0.016	Excel vs Unique P = 0.25	Unique vs Air-Q P = 0.13	

*IQR = Inter Quartile Range (25% - 75%).

of this study are still clinically relevant. When stratifying SGAs by grade of view, it was clear that the better the view of the larynx, the easier (lower VAS score) and faster the intubation proceeded. The Air-Q ILA™ consistently gave better views of the larynx most likely because there was no obstacle (no epiglottic elevating bars or aperture bars) to impede the view of the vocal cords, and subsequently consistently received lower subjective VAS scores from the intubators. However, the lower subjective scores did not correlate with the intubation times. We believe this is most likely due to the skill of our intubators. Intubators performing this procedure were all senior anesthesia residents on their Clinical Airway Rotation. During this 4-week rotation, residents use the FOB every day to intubate and become very skilled with navigating the FOB. They are able to maneuver around any obstacle (epiglottic elevating bar or aperture bars) with ease so that the presence of an obstacle likely had

Table 3. Results stratified by Grade of View of the Larynx.

Parameter	Grade I	Grade II	Grade III
Successful Intubations**	N = 34 (34, 0, 0)*	N = 64 (9, 28, 27)*	N = 21 (2, 8, 11)*
Failed Intubations**	N = 0 (0, 0, 0)	N = 2 (0, 0, 2)	N = 3 (0, 3, 0)
True Intubating Time (T2) in seconds	Mean: 75.1 Median: 69.5 IQR: (53 - 91)	Mean: 92.7 Median: 85.0 IQR: (55 - 121)	Mean: 111.6 Median: 110 IQR: (75.5 - 137)
Kruskal-Wallis Test, **P < 0.05** Post Hoc Analysis (Dunn's Multiple Comparison Test)	Grade I vs Grade II P > 0.05	Grade II vs Grade III P > 0.05	Grade I vs Grade III **P < 0.01**
Visual Analog Scale (VAS)	Mean: 1.9 Median: 2 IQR: (1 - 2)	Mean: 3.2 Median: 3 IQR: (2 - 4)	Mean: 4.9 Median: 5 IQR: (4 - 6)
Kruskal-Wallis Test, **P < 0.05** Post Hoc Analysis (Dunn's Multiple Comparison Test)	Grade I vs Grade II **P < 0.001**	Grade I vs Grade III **P < 0.01**	Grade II vs Grade III **P < 0.001**
Intubation Success Rate # Success/# Total, %	34/34, 100%	64/66, 97.0%	21/24, 87.5%
Chi-Squared Test, **P < 0.05** Post Hoc Analysis (Chi-Squared)	Grade I vs Grade II P = 0.31	Grade II vs Grade III P = 0.83	Grade I vs Grade III **P = 0.03**

*(Number of Air-Q ILA™, number of LMA Classic Excel™, number of LMA Unique™). **There were two intubation failures due to grade IV views of the larynx and both of these were from the LMA Classic Excel™ group. These two intubation failures are not included in this table.

very little effect on overall intubation times. With more novice operators, the aperture or epiglottic elevating bar would likely cause a greater hindrance leading to longer intubation times. Despite the lack of statistically significant faster intubation, the Air-Q ILA™ still offers several advantages when compared to both the LMA Classic Excel™ and the LMA Unique™. These advantages include significantly better fiberoptic views of the larynx when compared to both the LMA Classic Excel™ and the LMA Unique™, the use of larger diameter ETTs (as compared to the LMA Unique™); a higher success rate (as compared to the LMA Classic Excel™), and an overall "easier" intubation procedure (lower VAS scores) when compared to both the LMA Classic Excel™ and the LMA Unique™.

The findings of this study also have two other important clinical implications. First, the technique described here uses a continuous ventilation technique. Ventilation is only interrupted after the placement of the endotracheal tube in the trachea has been confirmed by fiberoptic bronchoscopy and for only approximately 30 seconds while the SGA is removed. In contrast, all rigid laryngoscopic methods of tracheal intubation require complete cessation of ventilation for the duration of the tracheal intubation attempt. A continuous ventilation technique could prove extremely importance in increased BMI patients prone to rapid oxygen desaturation or patients with any form of lung disease that impairs oxygenation.

Second, although the SGA is a well-recognized ventilation rescue option to the "cannot ventilate" (CV) and "cannot ventilate/cannot intubate" (CVCI) situations [1] [4], there is very little evidence in the literature to support the use of one SGA over another in the dreaded CVCI scenario. The oldest and previously most widely used SGA for tracheal intubation was the LMA Fastrach™ (LMA North America), which utilizes a blind technique for tracheal intubation. However, the blind intubation technique with the LMA Fastrach™ has a first pass success rate of only 74% - 80% [5] [6] which is much lower than the 100% success rate with the Air-Q ILA™ reported here. The LMA Fastrach™ can also be used with a FOB aided intubation technique. However, it is likely that using a FOB aided technique with the LMA Fastrach™, which also has an epiglottic elevating bar similar to the LMA Classic Excel™, would produce similar inferior VAS scores to that of the LMA Classic Excel™.

The present study invites at least two more future studies. First, this tracheal intubation technique with the SGAs used in this study should be compared with other omnipresent SGAs likely to be encountered in the larger anesthesia community. These other omnipresent SGAs include the LMA Fastrach™ and the LMA Proseal™ (utilizing a FOB assisted sequential placement of an Aintree Intubation Catheter™ and an ETT over the Aintree Intubation Catheter™) [7] [8]. Second, this tracheal intubation technique should also be studied in patients with anatomically difficult airways such as the morbidly obese or in emergency situations wherein patients cannot be conventionally intubated with direct laryngoscopy. These studies will better define the breadth of clinical indication for this highly promising and apparently efficacious intubation technique.

We conclude that the Air-Q ILA™ provides the best view of the larynx and is the easiest one to use as an intubation conduit.

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