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King Vision *vs.* Intubating Laryngeal Mask Airway (ILMA) For Intubation of Obese Patients

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Abstract

Background and aims: Our purpose was to compare using King vision (KV) and ILMA for intubation of obese patient.

Methods: This prospective randomized research was implemented on 60 obese patients underwent electoral surgeries under general anesthesia. The study included 2 groups, Group 1: ILMA was used to intubate tracheal and Group 2: King vision was used for tracheal intubation. We noticed time to tracheal intubation, number of attempts, number of successful trial, lowest SpO_2, any adverse events, bleeding, intubation difficulty score, SpO_2, HR, and mean blood pressure.

Results: When compared to ILMA, King vision was associated with shorter time to tracheal intubation (17.96 ± 5.12 *vs.* 133.7 ± 44.12 s), less adverse events, less intubation difficulty score (1.23 ± 0.43 *vs.* 3.8 ± 0.84) and higher first attempt intubation rate (100% *vs.* 86.6%).

Conclusion: King vision was superior to ILMA for intubation of patients suffering from obesity as it showed shorter intubation time, less intubation attempts, less trauma, better intubation difficulty score, and better SpO_2.

Keywords: King vision; ILMA; Obese

Introduction

Obesity represents an increasing health problem everywhere. A person is considered as obese if weight in kg / square height in meter (BMI) is 30 kg/m_2 or more [1].

It was reported that the percentage of obesity in patients presented for surgery is more than general population [2]. Consequently, anesthesiologists are going to deal with increasing count of obese patients. It is more difficult to intubate patients suffering from obesity than normal weight patient [3]. Inability to intubate trachea during anesthesia may be accompanied with many complications up to deaths during anaesthesia [4]. Consequently, the usage of new tools that improve the achievement of tracheal intubation, particularly in settings of potentially difficult intubation, can have a profound clinical impact.

Intubating Laryngeal Mask Airway (ILMA) (The Laryngeal Mask Company Limited Le Rocher, Victoria, Mahé, Seychelles) is used for ventilation and intubation of routine and difficult airway [5].

King Vision (KV) (King Systems, Noblesville, IN, USA) is a portable battery powered video laryngoscope that is composed of reusable monitor and disposable blade which may be channeled or non-channeled. It is used successfully for tracheal intubation [6].

The intent of this research was to compare using KV and ILMA for intubation of patient suffering from obesity during induction of anesthesia.

Methods

After assent of local institutional ethical board and written and informed consent was gained from every patient, this randomized prospective study was executed in Tanta University Hospital for 6 months on 60 obese adult patients (ASA I-III) undergoing electoral surgeries that necessitate general anesthesia and orotracheal intubation. Every patient was given a secret code number, and received an explanation to the intent of the study. Patients were involved in the research if they were listed for electoral surgeries that necessitate general anesthesia and orotracheal intubation and their BMI ≥ 30 kg/m2, Age ≥ 18 year and ASA physical status I-III. Exclusion criteria included patients with BMI<30 kg/m2, younger than 18 years, had ASA physical status IV or V, required a nasal intubation, or at risk of aspiration (hiatus hernia, not fasted, or esophageal reflux). Also, patients with a history of impossible intubation, interincisor distance<20 mm, or cervical spine fixed in flexion were excluded due to susceptibility of impossible intubation.

Participants were assigned randomly to 2 equal groups (each 30 patients) to be intubated using either ILMA (group 1) or King vision (group 2).

Block Randomization was done using computer to produce a roll of numbers, each number refer to one group.

Block randomization was applied to be sure that each group had the same number of patients. Then each number was sealed in opaque envelope. Each patient was asked to choose an envelope and give it to the anesthesiologist who compared the number with computer generated list and accordingly specify the participant to one group.

In the operating theater, patients were positioned in sniffing position with 30° anti-Trendelenburg position. All patients were connected to standard monitors including pulse oximetry (SPO_2), five-lead electrocardiogram, noninvasive blood pressure (BLP) monitor, Bispectral (BIS) index, and end-tidal carbon dioxide. Using facemask patients were given 100% oxygen (O_2) for 5 min. Anesthesia was induced with fentanyl (Sunny pharmaceutical, Egypt under license of Hameln pharmaceutical, Germany) 1 μg/kg, propofol (Astra Zeneca UK) 1.5 mg/kg, and succinylcholine 1 mg/kg. Then patients were ventilated though facemask with 100% O_2 for 1 min and trachea was intubated. If bispectral index was above 60 before intubation, 50 mg of propofol was given to decrease BIS index below 60. Intubation of the trachea was accomplished by well-trained anesthesiologists with good experience in difficult airway management. Tracheal intubation was confirmed by CO_2 detection in expiration by capnography and bilateral chest auscultation. At this stage, atracurium (GlaxoSmithKline, UK) 0.5 mg/kg was given and anaesthesia was continued with sevoflurane (Kahira pharmaceuticals and chemical industries company, Egypt under license of Abbvie UK) (1.2–2%) in an oxygen/air mixture. For 5 min after tracheal intubation, no other drugs were administered, and no procedures were performed.

In group 1 the ILMA was lubricated, introduced into the mouth and pushed to its position in the pharynx, then the cuff was inflated. Chandy maneuver (consists of 2 steps first step is to grasp the handle and rotate it in sagittal plane till you get minimal resistance to bag ventilation, second step is to grasp the handle and lift the ILMA away from the hind wall of the pharynx) was used as necessary till effective ventilation was established. Then flexible and reinforced ILMA tube was used to intubate trachea. Then ILMA was removed while maintaining the tube in place, then the circuit was attached, and tube position was assured with auscultation and capnography.

In KV group (group 2) the monitor was attached to the channeled blade. The rear part of the blade and the channel of the tube were lubricated then the tube was inserted in the channel, stopping at the end of the channel. The blade of the KV with the tube inside was introduced in the midline with the monitor to the left side of the patient, then the KV was rotated inline toward the feet and the blade was pushed over the tongue to reach the vallecula. Once the tip reached beyond the epiglottis, a force was applied upward to get a good laryngeal view then the tube was pushed under vision till the cuff passed the vocal cords. Then the KV was removed while maintaining the tube in place, the circuit was attached, and tube position was assured with auscultation and capnography.

In both groups if tracheal intubation (using any of the two devices used in the study) could not be achieved after two attempts, the trial was classified as 'failed', and the airway was treated as indicated.

If the device was taken out of the mouth for any reason or if SpO_2 decreased below 92% before intubation this was classified as failed attempt.

If SpO_2 dropped below 92%, the attempt was interrupted, and mask ventilation was resumed with 100% oxygen and sevoflurane 2%.

A difficult airway cart, including laryngeal LMA, Combi tubes, and cricothyroidotomy sets, was immediately available. The primary outcome was time to tracheal intubation (which is the time passed between introducing the device into the mouth and insertion of the tube into the trachea as proved by capnography excluding the time of mask ventilation between attempts). Secondary outcomes included, number of attempts, number of successful trial, lowest SpO_2, any adverse events (as oxygen desaturation (SpO_2<90%), trauma, or others), bleeding (suction of the mouth after intubation to detect any bleeding which was be rated as non=0, 1 mild amount=1, moderate amount=2, large amount=3), and visual analogue scale (VAS) for intubation difficulty after successful intubation [VAS ranging from 0 to 10 was used by the anesthesiologist to grade the difficulty of the intubation (intubation difficulty score IDS) where 10 is the most difficult]. Also, SpO_2, HR, mean blood pressure (MBP) was measured before anaesthesia, after induction, after insertion of the device, and then after insertion of tube every min for 5 min (Figure 1).

Sample size was calculated to detect a difference of 25 s in intubation time between groups and assuming standard deviation of 30 s (from our pilot study before). Based on this data sample size was found to be 25 patients/group to reach an alpha error of 0.05 and power of 80% (beta error of 0.2). We intended to include 30 patients/group (to compensate for excluded patients).

Statistical analysis

Statistical program for social science (SPSS) version 20 (IBM, Armonk, NY, United States of America) was used for statistical analysis. Data were expressed as mean ± standard deviation (SD), frequency, or frequency and percentage. Quantitative data were analyzed using independent sample T test. Qualitative data were analyzed using Chi-Square (X^2) test. A $P< 0.05$ was regarded to be significant.

Results

Both groups were comparable as regards patient characteristics (Table 1). Airway management parameters are displayed in Table 2. Time to tracheal intubation was significantly longer in ILMA group (133.7 ± 44.12 s) compared to KV group (17.96 ± 5.12 s). All patients in KV group were intubated in the first attempt while in ILMA group 26 participants were intubated in the 1st attempt and 4 participants were intubated in the second attempt. Intubation was successful in 100% of patients in both groups.

	Group 1	Group2
Age	48.9 ± 14.28	51.5 ± 13.53
Sex M/F	30/10	31/9
BMI	34.53 ± 2.62	35.06 ± 2.59
ASA		
1	0 (0%)	0 (0%)
2	17 (56,6%)	16 (53.3%)
3	13 (43.3%)	14 (46.6%)
* Significant difference between group P<0.05		

Table 1: Patients characteristics. Data are expressed as mean ± SD, or number (percentage).

Regarding adverse events trauma to mucosa was significantly higher in ILMA group compared to KV group (6 patients *vs.* no patients) and O_2 desaturation occurred in 1 patient in ILMA group. Mouth suction (bleeding amount) and IDS were significantly higher in ILMA group compared to KV group (0.73 ± 0.58 *vs.* 0.2 ± 0.4 for mouth suction and

3.8 ± 0.84 *vs.* 1.23 ± 0.43 for IDS). Lowest SpO_2 was significantly low in ILMA group compared to KV group (95.86 ± 1.61 *vs.* 98.9 ± 0.3).

ILMA group and KV group were comparable regarding MBP (Figure 1) except after insertion of the device and 1 min after intubation where MBP was significantly higher in ILMA group compared to KV group.

Regarding HR and SpO_2 ILMA group and KV group were comparable (Figures 2 and 3) except after insertion of the device where HR was significantly higher in ILMA group compared to KV group and SpO_2 was significantly lower in ILMA group compared to KV group.

	Group 1	Group 2	P
Time (T2) to tracheal intubation (s)	133.7 ± 44.12	17.96 ± 5.12	0.000*
Number of intubation attempts 1/2/3	26/4/0 86.6%/13.4%/0%	30/0/0 100%/0%/0%	0.039*
Successful trial	30 (100%)	30 (100%)	
Adverse events			
O_2 desaturation (SPO_2<90%)	1	0	0.32
Trauma	6	0	0.01*
Others	0	0	
Bleeding (Mouth suction)	0.73 ± 0.58	0.2 ± 0.4	0.00*
Lowest O_2 saturation	95.86 ± 1.61	98.9 ± 0.305	0.00*
Intubation difficulty score IDS	3.8 ± 0.84	1.23 ± 0.43	0.00*
*Significant difference between group P<0.05			

Table 2: Airway management parameters. Data are expressed as mean ± SD, or number.

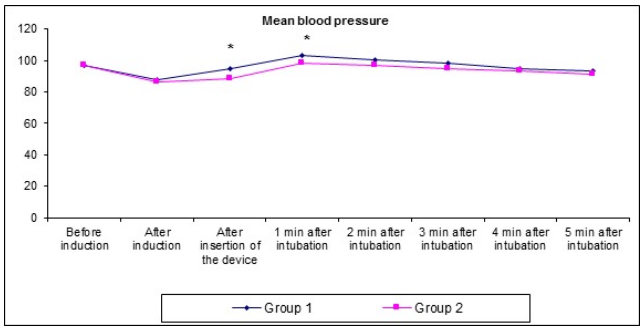

Figure 1: Mean blood pressure (Data are expressed as mean). *Significant difference between group P<0.05.

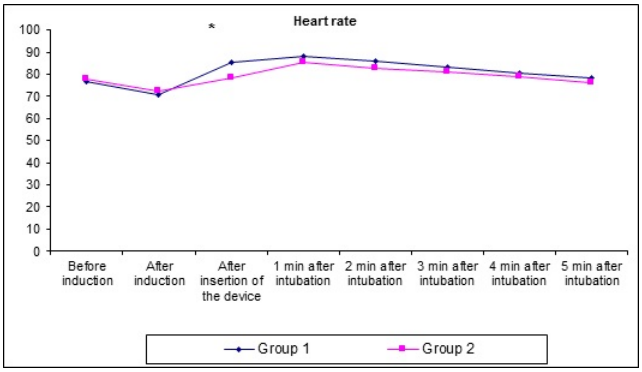

Figure 2: Heart rate (Data are expressed as mean). *Significant difference between group P<0.05.

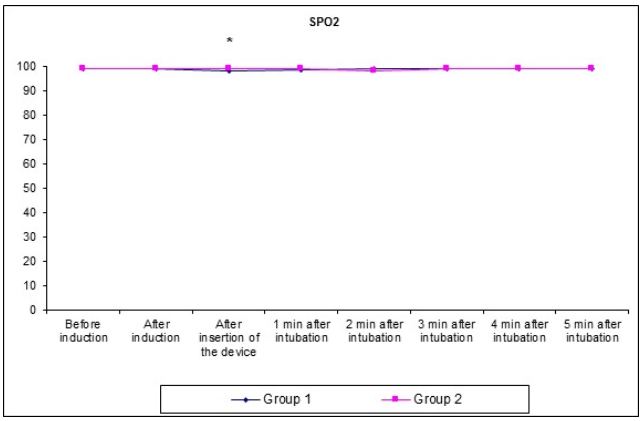

Figure 3: Oxygen saturation (Data are expressed as mean). *Significant difference between group P<0.05.

Discussion

It was demonstrated that obesity is linked with difficult intubation [3]. ILMA was used successfully to intubate obese patient [5]. Several studies used King vision successfully to intubate patients with different Mallampati score [7-9].

To our knowledge there is no study before compared ILMA and KV to intubate obese patients.

The main finding of our study is that when we compared ILMA and KV for intubation of patients suffering from obesity, the performance of KV was superior as it showed shorter time to tracheal intubation, less adverse events and intubation difficulty score and higher first attempt intubation rate (100%).

Regarding hemodynamics and SpO_2, ILMA and KV were comparable except after insertion of the device (where HR and MBP were higher and SpO_2 was lower in ILMA group) and one min after intubation (where MBP was higher in ILMA group). The differences in the results between the two devices may be due to different shape, structure, and method of intubation.

Arslan ZI et al. [5] used ILMA *vs.* LMA CTrach to intubate 80 patient suffering from morbid obese (40/group) and reported that with ILMA group the total tracheal intubation time [median (range)] was 78 (63-105) s, the number of intubation attempts (1/2/3) were 33/5/2 patients, and mucosal damage was noticed in 25% (10) of patients.

Ydemann M et al. [10] compared Glidescope and ILMA (Fastrach) for intubation of patients suffering from morbid obesity and concluded that ILMA group showed that intubation time was 61 s, 84% of participants (n=42) were intubated in the 1st attempt, 5 patients (10%) could not be intubated in the second attempt and no desaturation occurred.

Combes X et al. [11] compared the use of ILMA for intubation of morbidly obese *vs.* lean patients and concluded that in morbid obese patients ILMA showed that the total duration to manage airway was 160 ± 51 s (time from holding of ILMA to its removal after tracheal intubation), lowest O_2 saturation was 96% ± 3, success rate was 96%, visual analog scale (0-100) for airway management difficulty was 29 (10-40) (median (IQR25-75%)).

Özdil S et al. [12] compared ILMA and Glidecope for intubation of patients with rigid neck collar and demonstrated that success rate was 96% in both groups, both insertion and intubation times were longer for ILMA (21.9 ± 6.5 s and 48.4 ± 11 s), total time for intubation was longer for ILMA (85.6 ± 13 s), damage to mucosa was higher with ILMA, and both devices increased HR and blood pressure.

Kolli S et al. [13] compared ILMA with fiberoptic bronchoscope for intubation of patients prepared for cervical discectomy and demonstrated that success rate was 100% in each group, 10% in each group required 2 intubation attempts, the time needed for intubation was significantly longer with ILMA (38.1 ± 11.5 s) and the incidence of sore throat was comparable.

Kamal et al. [7] compared KV with Lightwand for intubation of patients with Mallampatti grade 3 and 4 and found that the mean time for intubation with KV was 19.50 ± 6.73 s (ours was 17.96 ± 5.12 s)

Alvis et al. [9] compared the McGrath MAC and KV for intubation of patients with normal airways and reported that first attempt success rate with KV was 77% (24 of 31 attempts) and hypoxic episode (SpO_2 less than 90%) occurred in 3 patients (9%) (Our result showed that all patients in KV group were intubated in the 1st attempt and no patients suffered from hypoxic episodes).

Shravanalakshmi et al. [14] used KV in comparison with C-MAC to intubate patients with cervical immobilization (due to cervical spine injury). They reported that with KV group intubation time was 18.9 ± 7.2 s and intubation required one attempt in 93.3% of the patients and two attempts in 6.7% of the patients (our result showed that intubation time was 17.96 ± 5.12 s and all participants were intubated in the 1st attempt in KV group).

Limitations

It was impossible for anesthesiologists who intubated the patients to be blinded to the studied devices and the anesthesiologist may prefer one device and this may affect the results.

Conclusion

We concluded that king vision showed shorter intubation time, less intubation attempts, less trauma, better intubation difficulty score, and better SpO_2 when compared to ILMA for intubation of patients suffering from obesity.

References

1. Low S, Chin MC, Deurenberg-Yap M (2009) Review on epidemic of obesity. Ann Acad Medical Singapore 38: 57-59.
2. Riley RH, Burke V (1997) Prevalence of obesity in surgical patients: a comparative survey in the United States and Australia. J Qual Clin Pract 17: 147-154.
3. Juvin P, Lavaut E, Dupont H, Lefevre P, Demetriou M, et al. (2003) Difficult tracheal intubation is more common in obese than in lean patients. Anesth Analg 97: 595-600.
4. Caplan RA, Posner KL, Ward RJ, Cheney FW (1990) Adverse respiratory events in anesthesia: A closed claims analysis. Anesthesiology 72: 828-833.
5. Arslan ZI, Özdamar D, Yildiz TS, Solak ZM, Toker K (2012) Tracheal intubation in morbidly obese patients: a comparison of the Intubating Laryngeal Mask Airway™ and Laryngeal Mask Airway CTrach™. Anaesthesia 67: 261-265.
6. El-Tahan MR, Doyle DJ, Khidr AM, AbdulShafi M, Regal MA, et al. (2014) Use of the King Vision™ video laryngoscope to facilitate fibreoptic intubation in critical tracheal stenosis proves superior to the GlideScope. Can J Anaesth 61: 213-214.
7. Kamal S, Ali QE, Amir SH, Ahmed S, Pal K (2016) King Vision video laryngoscope vs. Lightwand as an intubating device in adult patients with Mallampatti grade III and IV patients. J Clin Anesth 34: 483-489.
8. Ali QE, Amir SH, Jamil S, Ahmed S (2015) A comparative evaluation of the Airtraq® and King Vision® video laryngoscope as an intubating aid in adult patients. Acta Anaesth. Belg 66: 81-85.
9. Alvis BD, Hester D, Watson D, Higgins M, St Jacques P (2016) Randomized controlled trial comparing the McGrath MAC video laryngoscope with the King Vision video laryngoscope in adult patients. Minerva Anestesiol 82: 30-35.
10. Ydemann M, Rovsing L, Lindekaer AL, Olsen KS (2012) Intubation of the morbidly obese patient: GlideScope(®) vs. Fastrach™. Acta Anaesthesiol Scand 56: 755-761.
11. Combes X, Sauvat S, Leroux B, Dumerat M, Sherrer E, et al. (2005) Intubating laryngeal mask airway in morbidly obese and lean patients: a comparative study. Anesthesiology 102: 1106-1109.
12. Özdil S, Arslan Zİ, Baykara ZN, Toker K, Solak ZM (2016) Tracheal intubation in patients immobilized by a rigid collar: a comparison of GlideScope and an intubating laryngeal mask airway. Turk J Med Sci 46: 1617-1623.
13. Chalam KS, Gupta J (2016) Comparison of intubating laryngeal mask airway and fiberoptic bronchoscopy for endotracheal intubation in patients undergoing cervical discectomy. J Anaesthesiol Clin Pharmacol 32: 515-518.
14. Shravanalakshmi D, Bidkar PU, Narmadalakshmi K, Lata S, Mishra SK, et al. (2017) Comparison of intubation success and glottic visualization using King Vision and C-MAC videolaryngoscopes in patients with cervical spine injuries with cervical immobilization: A randomized clinical trial. Surg Neurol Int 6: 8-19.