ORIGINAL RESEARCH PAPER

Volume - 12 | Issue - 04 | April - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

COMPARISON OF CHANNELLED KING VISION VIDEOLARYNGOSCOPE WITH CHANNELLED BPL VIDEOLARYNGOSCOPE AS AN INTUBATING AID IN ADULT PATIENTS- A PROSPECTIVE, RANDOMIZED, CLINICAL STUDY

Anaesthesiology

Dr. Dixita Vaghela 3rd Year Resident, Department Of Anesthesiology, Medical College And S.S.G. Hospital, Vadodara.

Dr. Apeksha Patwa* MD Anaesthesia, Associate Professor, Department Of Anesthesiology, Medical College And S.S.G. Hospital, Vadodara. *Corresponding Author

Dr. Sagar Bavisetti Class 1 Anaesthetist, Sub District Hospital, Halol.

Dr. Nidhi Maru 3rd Year Resident, Department Of Anesthesiology, Medical College And S.S.G. Hospital, Vadodara.

ABSTRACT

Background and Aims: Majority of Difficult Airway (DA) guidelines emphasise the role of Video laryngoscope (VL) in managing both predicted and unpredicted DA. It is the need of today's era that we acquire at least basic skill of video laryngoscope guided intubation. BPL VL is a recently (April 2019) introduced intubating device with high resolution CMOS camera. The primary aim of this study was to compare the efficacy of BPL VL with King vision VL regarding their usefulness for tracheal intubation using their channelled blade in adult patients with normal preoperative airway assessment. **Methods:** It was a prospective, randomized clinical study. 100 patients of 18-60 years age group, of either gender and Mallampati grade 1 & 2 scheduled to undergo surgery requiring endotracheal intubation in SSGH, Vadodara were included. Patients with pregnancy, anticipated difficult airway and obesity were excluded. They were randomly divided into 2 groups (K & B) using sealed envelope method. Parameters observed were glottic visualization time(T1), tube insertion time (T2), total time of intubation, number of attempts, optimization maneuvers required for intubation, quality of visualization using Cormack and Lehane grade, vital parameters, and complications. **Results:** Video laryngoscopy time, tube insertion time, total time of intubation were less in group K compared to group B, p value being <0.01. Rest of the parameters were comparable in both the groups. **Conclusion:** BPL VL can be used as an alternative to King vision VL.

KEYWORDS

Video laryngoscope; King Vision ; BPL;Tracheal intubation

INTRODUCTION

Airway management is one of the basic tenets of anaesthesia management. Direct laryngoscopy with Macintosh laryngoscope is considered the gold standard for endotracheal intubation since its introduction in 1943. The inability to establish a definitive airway is being responsible for major airway-related morbidity and mortality. It was first described by Caplan et al in 1990[1]. After the invention of first videolaryngoscope in 2001 by Canadian surgeon Dr. John Pacey, a paradigm shift in the management of airway has occurred[2]. Despite a few drawbacks, tracheal intubation with these devices has increased in success rate and laryngeal view, and they are currently used as a first backup approach when other intubation attempts fail. The shared visual confirmation of tracheal tube placement dramatically improves the margin of safety in difficult airway circumstances, especially when the larynx is anterior. [2] Although VL scopes provide us with excellent views of the glottic, if there is a fogging or secretions, the view could be obscured. Passage of endotracheal tube is easier with channelled blade compared to non-channelled blade.[3]

Plenty of literatures are available regarding comparison of King Vision VL with conventional Macintosh laryngoscope and other VL for routine as well as difficult airway management. BPL VL is recently introduced in the market and no scientific study on it is available. BPL VL was available in our institute hence, we undertook this study to evaluate and compare the efficacy of BPL VL with commonly used King Vision VL for tracheal intubation in adults.

METHODOLOGY

After taking permission from Scientific and Ethical Research Committee (Clinical Trial Registration Number: REF/2022/ 02/ 051692) of Government Medical college and SSG Hospital, Vadodara, a single blinded randomized controlled trial was carried out. Total 100 adult, ASA I and II patients of either sex, between ages18 -60 years with BMI less then 40 who were admitted and scheduled for surgical procedures under general anaesthesia were selected. Patient with difficult airway, pregnant patients and those who were not willing to participate in the study were excluded from the study.

Sample Size Was Estimated As Follows:

A pilot study was done with 10 patients in each group. The parameter "Total duration of intubation 20.6 secs in king vision VL vs 26.8 secs in BPL VL" is taken as main parameter. A minimum of 46 patients per group (92 in total) will be required for the present study to estimate mean difference of total duration of intubation between two groups by 6.2 secs with standard deviation (SD) = 6.06secs (in group K) and 13.57secs (in group B) at 95% confidence and 80% power. We have taken sample size of 50 per group. Open Epi software is used to calculate the sample size.

On a visit before one day, a full airway assessment was performed as part of the pre-anesthetic checkup, and all patients underwent standard laboratory tests.

The procedure was described to every patient, and their written informed consent was obtained. Standard protocol for Nil per Oral guideline was followed. The intravenous line was secured, a monitor was connected, and baseline vital parameters were recorded after the patient was brought into the operating room. All patients were premedicated with Inj. Glycopyrrolate 5mcg/kg, Inj. Fentanyl 1.5mcg/kg and Inj. Ondansetron 0.1 mg/kg IV 5 minutes before induction.

GROUPING OF PATIENTS

The study population was randomly allocated to two groups using the sealed envelope method.

- Group K -in which King Vision VL with adult channelled blade (size 3 blade) was used for intubation
- Group B- in which BPL with adult channelled blade(size no. 3 or 4 blade) was used for intubation

Videolaryngoscopes were prepared as per grouping. In both the VL scopes preparation, adult channelled blade was mounted on the handle containing battery. The performance of the device was checked once by pushing the on button and checking the clarity of image on monitor. For both the devices, the tube to be used was lubricated with lignocaine spray. The respective devices were preloaded with appropriate size tube (7.0 in case of females and 8.0 in case of males) in tube guiding channel and smooth sliding of endotracheal tube through the channel was ensured.

Pre-oxygenation was performed for six minutes with 100% O2 with closed circuit. Inj. Propofol 2-2.5mg/kg intravenously was used to induce general anaesthesia, after loss of eyelid reflex Inj. Suxamethonium Chloride 1.5-2 mg/kg IV was given. After disappearance of fasciculations intubation was done by respective devices by myself. By keeping the head in neutral position, The King

Vision or BPL VL with pre-loaded tube was advanced from the centre of the tongue towards the glottis into the trachea by viewing on the screen of the monitor. After confirmation of tube insertion and cuff disappearance through vocal cords the device was removed and close circuit was attached. Tracheal intubation was confirmed by the square wave capnography. Following parameters were studied:

1. Videolaryngoscopy time: Time taken from introduction of Video laryngoscope to view of glottis. (T1)
2. Tube insertion time: Time taken from view of glottis to insertion of endotracheal tube and confirmation by capnography. (T2)
3. Total duration of intubation (T1+T2) in secs
4. No. of attempts of intubation/device insertion defined as each time the device was removed past the gum or teeth. Only two attempts were allowed.
5. Quality of visualization of glottic aperture: assessed according to Cormack and Lehane grading. Grade I: Visualization of entire vocal cords Grade II: Visualization of posterior part of the laryngeal aperture Grade III: Visualization of epiglottis Grade IV: No glottis structure seen.
6. Optimization maneuvers required for intubation: like Left/Right rotation, upward or outwards movement of the video laryngoscope and anticlock/clockwise rotation of tubes.
7. Vital parameters: Heart rate, Mean arterial pressure, SpO□ were noted at baseline, before induction, 1min after induction, before videolaryngoscopy, at interval of 1 minute, 5 minutes, 10 minutes, 15 minutes after intubation.
8. Complications: like Oropharyngeal trauma (assessed by detecting the presence of pharyngeal blood as None/ Trace/ Heavy After securing the endotracheal tube) and Injury to-teeth, tongue, tonsillar pillars were looked after.

A failed intubation attempt was defined as one where the patient could not be intubated despite optimising manoeuvres or where the procedure took longer than 120 seconds to complete. In case of failure, those cases were excluded from the study.

Intra-operatively, anaesthesia was maintained with O2+N2O (50:50) with inhalation agent sevoflurane and muscle relaxant injection vecuronium bromide 0.02 mg/kg IV.

Mean and Standard deviation values were taken out. Statistical analysis of the data for the various parameters was done using student's 't' test for all continuous variables and chi-square test was used for qualitative (nonparametric) data using MedCalc software. P value was used to determine the significance of a statistical study. The p value < 0.05 was considered as significant and p value <0.01 was considered as highly significant.

RESULTS

All 100 patients included in the study were analysed. The demographic parameters - age, sex, height, weight, ASA and BMI were comparable between both the groups [Table 1]. Table 2 shows that video laryngoscopy time, Tube insertion time and total duration of intubation were significantly less in group K compared to group B. Total duration of intubation in Group K was 16.36±3.40seconds and Group B was 20.86±2.43seconds, which was statistically highly significant (p value <0.01) though clinically not significant. There was no statistically significant difference observed between two groups in view of Number of intubation attempts, Quality of visualization of glottic aperture, Optimization maneuvers required and complications[Table 3]. The first attempt intubation success rate was 96%(48/50) in group K as compared to 90%(45/50) in group B. In both the groups, Not more than two attempts were needed to intubate the patients. Optimization maneuver (like upward/outwards movement and left/right rotation of the VL scope, anticlock/clockwise rotation of tubes) were required in 1/50 (2.00%) patient in group K as compared to 4/50(8.00%) in group B. The difference of Cormack and Lehane grading between group K and group B was comparable with Grade I view in 47/50 (94.00%) patients in Group K and 46/50 (92.00%) in Group B. Grade II view was seen in 3/50 (6.00 %) patients in Group K and 4/50 (8.00%) in Group B. Grade III and Grade IV were not seen in any patient with any device. There was no statistically significant intergroup variation observed in hemodynamic parameters – Heart rate, Mean arterial pressure and SpO2. (P > 0.05)

Table 1: Demographic Data

Parameters	Group K	Group B
Age (years)	37.84±12.01	39.06±12.01
Sex M:F	35:15	24:26
Height (cm)	152.38±6.42	151.66±4.67
Weight (kg)	55±4.61	54.42±4.50
BMI (kg/m²)	23.8±2.09	23.66±2.16
ASA grading ASA I:II	44:06	43:07

Table 2: Time Of Intubation

Parameters	Group K	Group B
Video laryngoscopy Time T1(secs)	11.3±2.92	14.24±2.24
Tube Insertion Time T2(secs)	5.06±1.03	6.62±1.60
Total Duration of Intubation (T1+T2) (secs)	16.36±3.40	20.86±2.43

Table 3: Intubation Parameters

Parameters	Group K	Group B
First Attempt of intubation	48(96.00%)	45(90.00%)
Second Attempt of intubation	2(4.00%)	5(10.00%)
Optimization maneuver		
Required	1/50 (2%)	4/50 (8%)
Not Required	49/50 (98%)	46/50 (92%)
Quality of visualization		
Grade I	47/50 (94%)	46/50 (92%)
Grade II	3/50 (6%)	4/50 (8%)
Grade III	0/50	0/50
Grade IV	0/50	0/50

DISCUSSION

Since last two decades, a steadily increasing number of Video laryngoscopes are available in the markets. Video laryngoscopes vary with regard to the curvature, and thickness of their blades, camera location and angle of visulisation, size and mobility of the video screen, integration of a channel for tracheal tube guidance. [4] The success of a VL assisted intubation depends on multiple factors, such as blade design-anatomically curved (j shaped or hyperangulated) or Non anatomically curved(Macintosh type)[2]; channelled or non channelled; quality of the image on the monitor, as well as the experience of the intubator.[5]

In our study, we compare king vision and BPL videolaryngoscope channelled blade for intubation time being our primary objective. Other parameters like, No. of attempts of intubation, Quality of visualization of glottic aperture, Optimization maneuvers required for intubation, Vital parameters and complications were also observed. We concluded that tube insertion time (5.06±1.03seconds vs. 6.62±1.60seconds) and total intubation time (16.36±3.40seconds vs. 20.86±2.43seconds) were significantly less with King Vision compared to BPL video laryngoscope. The channel of King Vision VL is better than BPL VL. Endotracheal tube snugly fits into it whereas in case of BPL VL it is loosely fit and so during intubation with BPL VL tube slides below vocal cord which takes more time for manipulation in order to intubate. It might be the reason that it took more time for intubation with BPL VL.(Fig 1 and 2)

Fig 1

Fig 2

A study by Shweta et al.,2019 compared King Vision Video laryngoscope with Airtraq video laryngoscope and reported less intubation time with King Vision. In their study, they concluded that with comparision to Airtraq, angle of the blade of King Vision video laryngoscope is more deep which creates clear image viewing in a 160° panoramic field which might have resulted in shorter time for intubation with King Vision.[1] Amit Shah et al.,2019 compared channelled blade versus non-channelled blade of the King Vision videolaryngoscope and conclude that shorter intubation time of 15.24 ± 10.6secs was taken with channelled blade when compared to 28.57 ± 14.09secs with Non channelled blade($P < 0.001$)[3]. Dr.G.Vineeth Reddy et al.,2021 also compared Airtraq and King vision channelled videolaryngoscope and found that time taken for intubation in Airtraq was 37.7 ± 4.6secs and for King vision, it was 29.9 ± 7.4secs. King vision took shorter time compared to Airtraq for intubation which was statistically significant ($p=0.001$)[4]

First attempt successful intubation was observed in 96.00% and 90.00% cases with King Vision and BPL respectively. Which was statistically insignificant and in accordance with the study done by Shweta et al.,2019[1] They observed 100% (30/30) first attempt success rate with King Vision VL scope compared to 93.33% (26/30) first attempt success rate with Airtraq VL scope. Both the groups were comparable regarding the view of glottis at laryngoscopy. Both devices facilitated almost similar quality of visualization of glottis. But from our study we found that KV VL scope has more concise view of glottic opening as compared to BPL VL. In BPL VL field of vision is wide and we are also able to visualize peripheral structures clearly. King Vision has anti-scratch OLED screen which auto-correct for white balance and has 4:3 display, which provides better and precise video quality compared to BPL VL. Though BPL VL also has 2MP camera with high-definition anti-fog lens, there were some issues of fogging during our study which can be easily overcome by using oxygen supplementation during intubation. Patrick Schoettker et al.,2015 from his study of comparision between Airtraq-airview and King Vision also concluded the same that there is no significant difference present between two devices with regards to quality of glottic opening visualization. Though they also concluded that Cormack Lehane best view during videolaryngoscopy before intubation was reported significantly better with the King Vision.[6]

In our study, we have not observed any statistically significant difference between 2 groups in view of optimization maneuver required for intubation which we have taken as left and right rotation, upward/outwards movement of the scope and clockwise/anticlockwise rotation of the tube. Although tube manipulation were more in BPL compared to King Vision. Alvis BD et al.,2016 also observed no significant difference between MacGrath MAC group and King Vision group in optimization maneuvers needed for intubation.[7] Hemodynamic parameters were also comparable between two groups in our study at recorded time interval. Which was in accordance with study done by Swayam Tara et al.,2019 they compared Airtraq and King vision VL scope with regard to Changes in haemodynamic variables at various intervals as the primary outcome and concluded that the heart rate, systolic blood pressure (SBP), diastolic blood pressure (DBP) and mean arterial pressure (MAP) values were comparable between both the groups for the time intervals recorded.[8] Shirley Joseph et al.,2019 also observed that there were no statistically significant difference between King Vision video laryngoscope and Macintosh laryngoscope in terms of oxygen saturation variation due to stress response during endotracheal intubation.[9]

In our study, There were no complications observed between any of group. Bret D. ALVIS et al. ,2016 did not documented any airway trauma events using both King Vision and BPL video laryngoscope.[7]

Limitations of our study include that we have taken only ASA grade I and II patients with MO >/=3FB and Mallampati grade 1 and 2. Results might be different with difficult airway situations (MO < 3FB and Mallampati grade >2), as the width of BPL blade is less compared to KV. Another limitation is that as we have used only PVC ET Tubes in our study, results might be different for other tubes. So, there is further scope of research available in this field.

CONCLUSION

We conclude from our study that though statistically lesser time was taken for intubation with King Vision compared to BPL video laryngoscope, it did not carry any clinical significance as well as no difference in other parameters studied, both the devices are useful for intubation in adult patients with normal airway.

Financial Support And Sponsorship: None.

Conflicts Of Interest: None.

REFERENCES

1) Shweta, Devyani Desai, M. R. Upadhyay. A Comparative Evaluation of Two Vidolaryngoscopes, the Airtraq and King Vision as an Intubating Aid in Adult Patients. Indian J Anesth Analg. 2019;6(6 Part -I):1930-1935
2) Myatra, Sheila Nainan; Patwa, Apeksh; Divatia, Jigeeshu Vasishtha. Videolaryngoscopy for all intubations: Is direct laryngoscopy obsolete?. Indian Journal of Anaesthesia 66(3):p 169-173, March 2022. | DOI: 10.4103/ija.ija_234_22
3) Shah A, Patwa A, Burra V, Shah D, Gandhi B. Comparison of channelled blade with non-channelled Blade of King Vision™ videolaryngoscope for orotracheal intubation: A randomised, controlled, multicentric study. Airway 2019;2(1):10-16.
4) Dr .G.Vineeth Reddy, Dr.Lokesh Padiri. A Prospective Comparative Study of Airtraq Versus King Vision Video Laryngoscope In Patients Undergoing Genral Anaesthesia For Elective Surgery. Journal of Dental and Medical Sciences, Volume 20, Issue 4 Ser.1 (April. 2021), PP 10-19
5) Shruthi AH, Dinakara D, Chandrika YR. Role of videolaryngoscope in the management of difficult airway in adults: A survey. Indian J Anaesth. 2020 Oct;64(10):855-862.
6) Patrick Schoettker and Jocelyn Corniche. The Airview study: Comparison of intubation conditions and ease between the Airtraq-Airview and the King-Vision. Biomed Research International-2015.
7) Alvis BD, Hester D, Watson D, Higgins M, St Jacques P. Randomized controlled trial comparing the McGrath MAC video laryngoscope with the King Vision video laryngoscope in adult patients. Aanesth 2016; 82:30-5.
8) Patrick Schoettker and Jocelyn Corniche. The Airview study: Comparison of intubation conditions and ease between the Airtraq-Airview and the King-Vision. Biomed Research International-2015.
9) Shirley Joseph, Bindu George, Surekha. Comparison of hemodynamic responses to laryngoscopy and orotracheal intubation between Macintosh laryngoscope and king vision video laryngoscope in adult surgical patients. Indian Journal of Clinical Anaesthesia 2019;6(4):607–613