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A PROSPECTIVE STUDY TO COMPARE THE DURATION OF TIME FOR LARYNGOSCOPY AND INTUBATION BETWEEN KING VISION LARYNGOSCOPE AND VIDEOLARYNGOSCOPE D BLADE.

Anaesthesiology

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ABSTRACT

Securing a definitive airway is one of the most important responsibility and skill of an anaesthesiologist . Endotracheal intubation is routinely done by direct laryngoscopy , it requires skills and experience to choose intubating device, positioning of patient, insertion of laryngoscopy blade and lifting up epiglottis, proper alignment of oro –pharyngeal-laryngeal axis, visualisation of vocal cords and insertion of endotracheal tube Therefore a better vision of vocal cords and easy insertion of tube will help to reduce airway related morbidity and mortality. Videolarygoscopes are devices with a video camera or video chip positioned near the tip of laryngoscopy blade. As a result other than viewing glottic opening from outside of oral cavity, it is visualised through hypo pharynx. This not only provides a better view but also eliminates the need to align oro-pharyngeal- laryngeal axis. In this study we have compared between king vision which is channeled blade and videolaryngoscope D blade which is unchanneled with regards to time for laryngoscopy, intubation and total procedure time.

KEYWORDS

King Vision Laryngoscope, Videolaryngoscope D blade, Channeled and unchanneled blade.

INTRODUCTION

Securing a definitive airway is one of the most important responsibility and skill of an anaesthesiologist [1]. It is required everywhere right from inducing a patient under general anaesthesia, to securing an airway in patients in trauma and ICU.

Endotracheal intubation is routinely done by direct laryngoscopy , it requires skills and experience to choose intubating device, positioning of patient, insertion of laryngoscopy blade and lifting up epiglottis, proper alignment of oro –pharyngeal-laryngeal axis, visualisation of vocal cords and insertion of endotracheal tube [1]. Therefore a better vision of vocal cords and easy insertion of tube will help to reduce airway related morbidity and mortality.

Videolaryngoscopes are one of the most recent advances in airway management in anaesthesia. Videolarygoscopes are devices with a video camera or video chip positioned near the tip of laryngoscopy blade. As a result other than viewing glottic opening from outside of oral cavity, it is visualised through hypo pharynx. This not only provides a better view but also eliminates the need to align oro-pharyngeal- laryngeal axis. Videolaryngoscope has also been included as an alternative method for difficult intubation in difficult airway algorithm [1].

Several different video laryngoscopes have been introduced , each having its own unique design , varying with shape of blade, video screen, channel for tracheal tube guidance ,and single or multiple use[1,2]. These videolaryngoscope can be classified under three groups.

1) Design based on Macintosh blade (e.g. C-MAC, McGrath, Glidescope titanium MAC),
2) Highly curved or distally angulated blades (e.g. C MAC D blade),
3) Videolaryngoscope with guided endotracheal tube channel (e.g. King vision channeled blade) [1, 2].

Thus in this study we will be comparing between king vision which is channeled blade and videolaryngoscope D blade which will be unchanneled with regards to time for laryngoscopy, intubation and total procedure time.

MATERIALS AND METHOD-

Inclusion Criteria:

- Written informed consent taken.
- Age 18 to 60 years.
- Posted for elective surgeries.
- Patient undergoing general anesthesia and endotracheal intubation.
- ASA grade 1 and 2 patients.
- MPC grade (Mallampati classification) 1 and 2 patients.

Exclusion Criteria.

- Patients with predicted difficult intubation.
- More than one attempt of intubation
- Thyromental distance <6cm
- Inter incisor distance < 3cm
- Reduced neck extension
- Cervical spine instability.
- Oropharyngeal or facial pathology.
- Pregnancy.

Withdrawal Criteria.

- Patients with unanticipated difficult intubation.
- Cormac Lehane grading >2.

Study Design

Prospective randomised comparative study for patients undergoing laryngoscopy and intubation under Anaesthesia 1 year at Department of Anaesthesia, in a tertiary care hospital and teaching institute in a metropolitan city in Western Maharashtra.

Study Groups

We studied two groups of patients undergoing laryngoscopy and intubation under Anaesthesia Department. Randomisation was done by block randomisation using computer generated tables. Group K– Was intubated by king vision which is a channeled blade ,Group D – Was intubated by videolaryngoscope D unchanneled blade

Methodology

- After approval from ethics committee 70 consenting ASA class 1 and class II patients were selected in age group of 18 to 60 years.
- Posted for elective surgeries under general anaesthesia after preanaesthetic evaluation.
- This group of 70 patients was divided in two groups.
- Group K: Intubation done with king vision which is a channeled blade
- Group D: Intubation done with videlaryngoscope D blade, for which C MAC D blade was used, which is an unchanneled blade.
- Patients were randomly assigned to one of the groups as per randomisation.
- Preanaesthetic evaluation including haematological, biochemical investigations, chest X ray, ECG as per hospital protocol.
- General anaesthesia was induced with Injection Fentanyl 2mcg/kg, Injection Propofol 2mg/kg, Injection Rocuronium 1mg/kg and ventilating patient with oxygen for 3 minutes. Then laryngoscopy and intubation was done with either king vision or videolaryngoscope D blade.
- Intubation is done with neutral position with manual in line stabilization, and mouth opening is done with scissoring technique.

Time for laryngoscopy is recorded from introducing video-laryngoscope blade in mouth till glottic opening is viewedTime for intubation is recorded from viewing glottic opening till insertion of tube and three end tidal carbon dioxide tracings.

- Total procedure time is recorded by adding laryngoscopy and intubation time. Thus it is time from introducing video-laryngoscope (either king vision or videolaryngoscope D blade) in

mouth , till insertion of tube and three end tidal carbon dioxide tracings
- Note for intubation with videolaryngoscope D blade, stylet is used with endotracheal tube.
- All anaesthetists who performed intubation on study cases have performed at least 20 intubations with both laryngoscopes.
- All data of laryngoscopy time, intubation time, total procedure time and any complications such a as trauma to airway is noted.

Stastical Analysis

The data was collected, compiled, and analysed using EPI info (version 7.2). The qualitative variables were expressed in terms of percentages. The quantitative variables both were categorised and expressed in terms of percentages or in terms of mean and standard deviations. The difference between the two proportions was analysed using chi-square or Fisher exact test. Student t test was used to test the difference between two means. All analysis was 2 tailed and the significance level was set at 0.05.

OBSERVATION AND RESULTS

We have included 35 cases in both the groups.

Table 1: Distribution of the Cases Based on Age Group

Age group	King vision		VDL D Blade		P value
	Number	%	Number	%	
<20	5	14.29	0	0	0.1726
21 to 30	5	14.29	7	20.00	
31 to 40	9	25.71	6	17.14	
41 to 50	10	28.57	12	34.29	
51 to 60	6	17.14	9	25.71	
>60	0	0	1	2.86	
Total	35	100	35	100	

Among the king vision group, 25.71% were in the age group of 31 to 40 years, 28.57% were in the age group of 41 to 50 years, 17.14% were 51 to 60 years groups, 14.29% each in less than 20 and 21 to 30 years.

Among the VDL D blade group, 20% were 21 to 30 years, 17.14% were in 31 to 40 years, 34.29% were 41 to 50, 25.71% were 51 to 60 years and 2.86% were more than 60 years. There was no significant difference between the age groups among the two groups

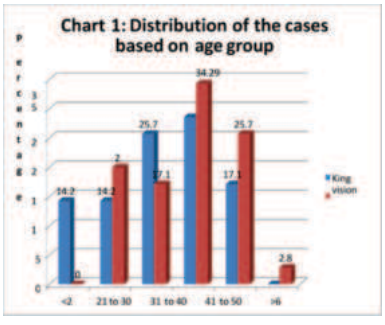


Table 2: Distribution of the Cases Based on Age

Age	King vision		VDL D Blade		P value
	Mean	SD	Mean	SD	
	36.06	11.47	39.51	10.90	0.1452

The mean age of the subjects among king vision group and VDL D blade group was 36.06 ± 11.47 years and 39.51 ± 10.90 years and this difference was statistically not significant.

Table 3: Distribution of the Cases Based on Gender

Gender	King vision		VDL D Blade		P value
	Number	%	Number	%	
Female	18	51.43	22	62.86	0.3339
Male	17	48.57	13	37.14	
Total	35	100.00	35	100.00	

Among king vision group, 51.43% were females and 48.57% were males. Among VDL D Blade group, 62.86% were females and 37.14% were males. There was no significant difference among the groups based on gender.

Table 4: Distribution of the Cases Based on Laryngoscopy Time

Laryngoscopy time (seconds)	King vision		VDL D Blade		P value
	Number	%	Number	%	
7 to 8	0	0	14	40.00	<0.001
8 to 9	13	37.14	19	54.29	
9 to 10	18	51.43	2	5.71	
>10	4	11.43	0	0	
Total	35	100	35	100	

The laryngoscopy time (seconds) among king vision group was 8 to 9 seconds in 37.14%, 9 to 10 seconds in 51.43% and more than 10 seconds in 11.43%.The laryngoscopy time (seconds) among VDL D blade group was 7 to 8 seconds in 40.00%, 8 to 9 seconds in 54.29% and 9 to 10 seconds among 5.71%.There was significant difference between the laryngoscopy times among the two groups.

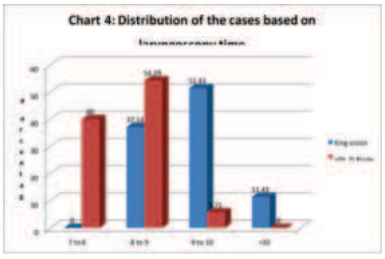


Table 5: Distribution of the Cases Based on Laryngoscopy Time

Laryngoscopy time	King vision		VDL D Blade		P value
	Mean	SD	Mean	SD	
	9.30	0.49	8.22	0.53	<0.001

The mean laryngoscopy time of the subjects among king vision group and VDL D blade group was 9.30 ± 0.49 seconds and 8.22 ± 0.53 seconds and this difference was statistically significant.

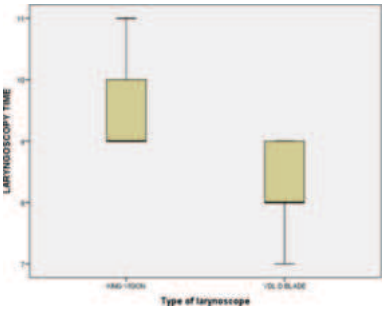
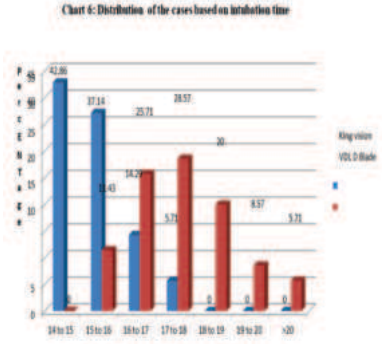


Chart 5: Box and Whisker Plot of Laryngoscopy Time Among the Two Groups

Table 6: Distribution of the Cases Based on Intubation Time (Seconds)

Intubation time seconds)	King vision		VDL D Blade		P value
	Number	%	Number	%	
14 to 15	15	42.86	0	0	<0.001
15 to 16	13	37.14	4	11.43	
16 to 17	5	14.29	9	25.71	
17 to 18	2	5.71	10	28.57	
18 to 19	0	0	7	20.00	
19 to 20	0	0	3	8.57	
>20	0	0	52	5.71	
Total	35	100	35	100	

Among the king vision group, 42.86% had intubation time of 14 to 15 seconds, 37.14% had between 15 to 16 seconds, 14.29% had between 16 to 17 seconds and 5.71% had intubation time of 17 to 18 seconds.



Among VDL D Blade group, 11.43% had intubation time of 15 to 16 seconds, 25.71% had between 16 to 17, 28.57% had between 17 to 18, 20% had between 18 to 19, 8.57% had between 19 to 20 seconds and 5.71% had more than 20 seconds.

There was significant difference between the intubation times among the two groups.

Table 7: Distribution of the Cases Based on Intubation Time (Seconds)

Intubation time	King vision		VDL D Blade		P value
	Mean	SD	Mean	SD	
	15.37	0.81	17.61	1.25	<0.001

The mean intubation time of the subjects among king vision group and VDL D blade group was 15.37± 0.81 seconds and 17.61 ± 1.25 seconds and this difference was statistically significant.

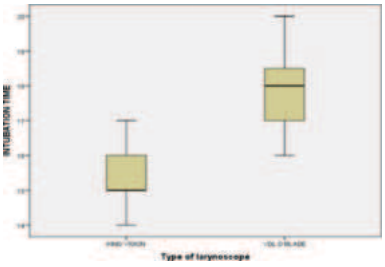


Chart 7: Box and Whisker Plot of Intubation Time Among the Two Groups

Table 8: Distribution of the Cases Based on Total Procedure Time

Total procedure time (seconds)	King vision		VDL D Blade		P value
	Number	%	Number	%	
23 to 24	10	28.57	1	2.86	0.0026
24 to 25	12	34.29	10	28.57	
25 to 26	9	25.71	9	25.71	
26 to 27	4	11.43	7	20.00	
>27	0	0	8	22.86	
Total	35	100	35	100.00	

Among the King vision group, the total procedure time (seconds) was between 23 to 24 seconds among 28.57%, 24 to 25 seconds among 34.29%, 25 to 26 seconds among 25.71% and 26 to 27seconds among 11.43%

Among the VDL D blade vision group, the total procedure time (seconds) was between 23 to 24 seconds among 2.86%, 24 to 25 seconds among 28.57% , 25 to 26 seconds among 25.71% , 26 to 27 seconds among 20.00% and more than 27 seconds among 22.86%.

There was significant difference between the total procedure times among the two groups.

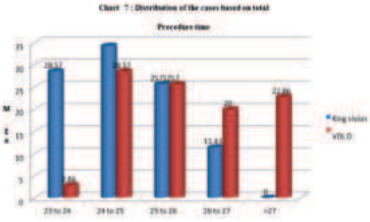


Table 9: Distribution of the Cases Based on Total Procedure Time

Total time	King vision		VDL D Blade		P value
	Mean	SD	Mean	SD	
	24.67	1.00	25.83	1.27	<0.001

The mean total procedure time of the subjects among king vision group and VDL D blade group was 24.67 ± 1.00 seconds and 25.83 ± 1.27 seconds and this difference was statistically significant.

DISCUSSION

After approval from ethics committee, we did a prospective randomized comparative study between king vision and video-laryngoscope D blade in 70 ASA 1 patients. We randomly divided them into two groups of 35 each in king vision and videolaryngoscope D blade. After taking consent, each of them was induced under general anesthesia with injection Propofol 2mg/kg, injection Fentanyl 2mcg/kg, and injection Rocuronium 1mg/kg. They were intubated either with king vision or videolaryngoscope D blade and the time for laryngoscopy (time from insertion of blade in mouth till visualization of vocal cords), time for intubation (time from visualization of cords till insertion of endotracheal tube and three end tidal carbon dioxide tracings) and total procedure time (time from insertion of blade in mouth till insertion of endotracheal tube and three end tidal carbon dioxide tracings) were noted in seconds. Also any complications were noted. Data was collected, compiled, and analysed using EPI info (version 7.2). The difference between the two proportions was analysed using chi-square or Fisher exact test. Student t test was used to test the difference between two means. All analysis was 2 tailed and the significance level was set at 0.05 and we got the results which are discussed in detail and compared to other similar studies as below.

Demographic Data

- **AGE**

We included 70 cases in this study belonging to age group from 18 to 60 years. Among the king vision group, 25.71% were in the age group of 31 to 40 years, 28.57% were in the age group of 41 to 50 years, 17.14% were 51 to 60 years groups, 14.29% each in less than 20 and 21 to 30 years.

Among the VDL D blade group, 20% were 21 to 30 years, 17.14% were in 31 to 40 years, 34.29% were 41 to 50, 25.71% were 51 to 60 years and 2.86% were more than 60 years. The mean age of the subjects among king vision group and VDL (videolaryngoscope) D blade group was 36.06 ± 11.47 years and 39.51 ± 10.90 years. On analysis there was no significant difference between the age groups among the two groups.

- **GENDER**

Among king vision group, 18 were female and 17 were male, (51.43% were females and 48.57% were males). Among VDL D Blade group, 22 were female and 13 were male (62.86% were females and 37.14% were males). There was no significant difference among the groups based on gender.

Laryngoscopy Time

In our study time from insertion of blade in the mouth till visualisation of glottis opening was noted as laryngoscopy time. The laryngoscopy time (seconds) among king vision group was 8 to 9 in 37.14%, 9 to 10 in 51.43% and more than 10 in 11.43%. The laryngoscopy time (seconds) among VDL D blade group was 7 to 8 in 40.00%, 8 to 9 in 54.29% and 9 to 10 among 5.71%. There was significant difference between the laryngoscopy times among the two groups. The mean laryngoscopy of the subjects among king vision group and VDL D blade group was 9.30 ± 0.49 seconds and 8.22 ± 0.53 seconds and this difference was statistically significant. Thus it was found that time required for laryngoscopy was less in VDL D blade as compared to King vision.

In similar study performed by Kleine Brueggeney et al , compared 6 video laryngoscopes and found that laryngoscopy time was 17seconds in C MAC D blade, 19 seconds in Glidescope, 18 seconds in Mc Grath, 20seconds in Airtraq, 30 seconds in A P advance, 26 seconds in king vision. Thus laryngoscopy time of C MAC was less as compared to King vision [13]. Another study was done by Sahajanandan et al in 63 patients comparing king vision and C MAC D blade , they found that laryngoscopy time with KVL group was 12.93 ± 8.58 s and CMAC D blade was 10 ± 5.32 s , thus lesser in C MAC group[11]. Chandy Jacob et al performed similar study in 100 patients where they compared King vision and C MAC D blade and got the results where laryngoscopy time was 22.43 ± 12.65 sec in king vision and 13.6 ± 10.89 in C MAC D blade . They had similar results with C MAC requiring lesser time for laryngoscopy [12].

- **Intubation Time**

In this study we calculated intubation time from visualisation of glottic opening till endotracheal intubation and three end tidal carbon dioxide tracings. All the time was noted with stop watch and in seconds. The king vision group, 42.86% had intubation time of 14 to 15 seconds, 37.14% had between 15 to 16 seconds, 14.29% had between 16 to 17 seconds and 5.71% had intubation time of 17 to 18 seconds. Among VDL D Blade group, 11.43% had intubation time of 15 to 16 seconds, 25.71% had between 16 to 17, 28.57% had between 17 to 18, 20% had between 18 to 19, 8.57% had between 19 to 20 seconds and 5.71% had more than 20 seconds. The mean intubation time of the subjects among king vision group and VDL D blade group was 15.37 ± 0.81 seconds

and 17.61 ± 1.25 seconds and this difference was statistically significant. Chandy Jacob et al performed a similar study where they compared between King Vision and CMAC D blade and found intubation time of 22.43 +/- 12.65 seconds in king vision and 13.6 +/- 10.89 seconds in C MAC. Thus they found that C MAC is better than King vision [12].

- **Total Procedure Time**

In this study total procedure time, was derived by addition of laryngoscopy and intubation time. Thus it was time observed from introduction of blade in mouth till endotracheal intubation and three end tidal carbon dioxide tracing.

Among the King vision group, the total procedure time (seconds) was between 23 to 24 seconds among 28.57%, 24 to 25 seconds among 34.29%, 25 to 26 seconds among 25.71% and 26 to 27 seconds among 11.43%. Among the VDL D blade vision group, the total time (seconds) was between 23 to 24 seconds among 2.86%, 24 to 25 seconds among 28.57%, 25 to 26 seconds among 25.71% , 26 to 27 seconds among 20.00% and more than 27 seconds among 22.86%. There was significant difference between the total procedure time among the two groups. The mean total procedure time of the subjects among king vision group and VDL D blade group was 24.67 ± 1.00 seconds and 25.83 ± 1.27 seconds and this difference was statistically significant.

In similar study by Sahajanandan et al found that time for intubation was 50.04 ± 24.17 s in King vision videolaryngoscope and 46.93 ± 26.59 s in C MAC group , which was not statistically significant but still lesser in C MAC [11].

In similar studies by Kleine Brueggeney et al , where in 720 patients they compared 6 Videolarygoscopes found that intubation time was 56 seconds in CMAC D blade, 60 seconds in Glidescope, 53 seconds in Mc Grath, 47 seconds in Airtraq, 93 seconds in A P advance, 59 seconds in king vision. It was least in Mc Grath and more in A P advance [9].

In study done by Ahmed et al where they compared between king vision and C MAC found that intubation time of 32.83 ± 5.33 sec in King vision and 25.2± 5.39 in C MAC. They therefore concluded that intubation was better with C MAC than King vision [26].

Shravanlaxmi et al in their study compared between King Vision with C MAC and C MAC D blade. The intubation time was 23.3 ± 4.7sec in C MAC , 24.9 ± 7.2 sec King vision in , and 26.7± 7.1 sec in C MAC D blade . They found that intubation was faster with conventional CMAC as compared to C MAC D blade. While King Vision and C MAC conventional had comparable intubation time [10].

Complications.

There were no noted complications in our study.

In similar study by Shravanlaxmi et al has reported only one patient intubated with King Vision had bronchospasm out of all 135 patients[10]. While in study performed by Kleine Brueggeny et al found that soft tissue trauma and bleeding in 9 patients in CMAC group, while 27 in Glidescope, 6 in Mc Grath , 19 in Airtraq ,43 in A P Advance, 14 in King vision out of 120 in each group[9]. Similar to our study there was no complications in study performed by Sahajanandan et al comparing C MAC to King vision.

CONCLUSION

We performed a prospective randomized study with aim to compare and study the time required for laryngoscopy , intubation and total procedure time between king vision (channeled) and video-laryngoscope D blade. After collecting data and analysing it , we concluded that laryngoscopy time was less in VDL D blade as compared to king vision , while intubation time was less in King vision as compared to VDL D blade and total procedure time was less in King vision than VDL D blade . Thus in our study King Vision was found better than VDL D blade.

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