

Address for correspondence:

Syed Hussain Amir
Department of Anaesthesiology
J. N. Medical College, A.M.U,
Aligarh, India
E-mail: hussainamir77@gmail.com

Comparison of intubation characteristics between non-channeled King Vision video laryngoscope and I-scope in simulated cases of restricted mouth opening in manikin. A pilot study

Muazzam Hasan¹, Qazi Ehsan Ali², Syed Hussain Amir¹

¹Assistant Professor, Department of Anesthesiology, Jawaharlal Nehru Medical College, AMU, Aligarh, Uttar Pradesh, India

²Professor, Department of Anesthesiology, Jawaharlal Nehru Medical College, AMU, Aligarh, Uttar Pradesh, India

ABSTRACT

Background and Aims: Restricted mouth opening limits all the options of conventional laryngoscopy and endotracheal intubation. Comparison of intubation characteristics between non-channeled King Vision laryngoscope and I-scope was done in simulated restricted oral opening scenario using manikin. **Materials and Methods:** Total 120 intubations were done by thirty participating anesthesiologists in manikin, with restricting mouth opening to 2 cm with the help of limiting sutures taken at angle of mouth to simulate difficult airway. Time of laryngoscopy until best glottic view was recorded. POGO score (percentage of glottic opening) was assessed; ease of intubation and incidence of successful intubation were also recorded with each laryngoscope separately in both the neutral and sniffing positions. **Results:** There was 100% success rate for intubation in both the groups. However, first attempt success rate was significantly higher in I-scope group compared to King Vision group (96.6% vs. 83.3%, $P=0.033$). The median time for best glottic view was comparable in both the groups (4.9 vs. 5.2 seconds; $P=0.157$), however overall duration for intubation was significantly lesser with I-scope when compared to King Vision (8.2 vs. 14.5 seconds; $P<0.001$). Ease of intubation and success of intubation in neutral position were also significantly better in I-scope group. POGO score was similar in both the groups. **Conclusion:** I-scope is helpful in securing the airway quickly and easily without much learning curve and expertise as compared to king Vision video laryngoscope in cases with limited mouth opening.

Key words: Airway, intubation, I scope, king vision, manikin

INTRODUCTION

Endotracheal intubation is a very crucial procedure as one's life is at stake if intubation fails or not performed timely and smoothly. Intubation is routinely performed as an elective procedure and may be also required on emergency basis. There are various predictors of difficult airway listed in literature and therefore a number of advances in the field of intubation are being introduced. Limitation in mouth opening <3 cm is one of the most obvious predictor of difficult airway^[1-3]. It poses two major problems in securing the airway. First the inability to insert the conventional scope in the mouth and second is the difficulty in aligning the oral, pharyngeal and laryngeal axes for intubation. All the options of conventional laryngoscopy

are out of question. King Vision with non-channeled blade has been tried in patient with limited mouth opening^[4,5]. Recently I-scope intubation device (Medishire) has been introduced. It is used as a stylet over which Endotracheal Tube (ETT) is loaded and intubation is carried out under vision on a video screen attached over top of it. In this study we have compared

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

How to cite this article: Hasan M, Ali QE, Amir SH. Comparison of intubation characteristics between non-channeled King Vision video laryngoscope and I-scope in simulated cases of restricted mouth opening in manikin. A pilot study. Central Journal of ISA 2018;2(1):14-17.

the efficacy of King Vision and I-scope in simulated restricted mouth opening in manikins. Till date there is no detailed study available comparing the two devices.

METHOD

In this study we used manikin (Laerdal Airway Management Intubation trainer) to simulate difficult airway by restricting mouth opening to 2 cm with the help of limiting sutures taken at angle of mouth. Intubations were carried out by three participating anesthesiologists, having no prior experience with either King Vision or I-scope. Prior to study participants were taught the steps and asked to perform ten intubations with each device on manikin to achieve a learning curve and get familiar with both the devices. Then each participating anesthesiologist performed twenty intubations with each device on the manikin with restricted mouth opening. Thus, a total of 120 intubations; 60 by each device were done for the study purpose.

With each device the intubation attempt was first taken in neutral position. If the larynx was not visualized, then the position was changed to sniffing. External manipulations like chin lift, jaw thrust, etc., were allowed. Failure of intubation was defined as an attempt in which trachea was not intubated even after third attempt or where intubation of trachea required more than 60 seconds. All the intubations were carried out using endotracheal tube size 7.5 mm ID.

The time taken for intubation was taken as the time taken from introduction of the device between incisors until the ETT was placed through the vocal cords, as evidenced by visual confirmation by the anaesthetist. The time from introduction of the device between incisors until best glottic view was recorded separately from time of intubation. POGO score (percentage of glottic opening) was assessed and recorded by the attending anaesthetist on a score of 1 - 4 (SCORE 1 = 75-100%, SCORE 2 = 50 - 75%, SCORE 3 = 25 - 50%, SCORE 4 = 0 - 25%). Ease of intubation was graded as Grade 1 = no extrinsic manipulation of larynx is required; Grade 2 = external manipulation of larynx is required to intubate; Grade 3 = failed intubation. The incidence of successful intubation was recorded with each laryngoscope separately in both the neutral and sniffing positions.

Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) version 16 (SPSS Inc. Released 2007, SPSS for Windows, version 16.0. Chicago, Illinois, USA). The results were presented in number, percentage, mean and standard deviation as appropriate. Data for duration of intubation attempt was analyzed using the unpaired t-test. Data for the incidence of successful intubation, number of intubation

attempts, ease of intubation and POGO score were analyzed using Fisher's exact test. The p value < 0.05 was taken as significant.

RESULT

There was 100% success rate for intubation in both the King Vision and I-scope groups. However, first attempt success rate was significantly higher in I-scope group compared to King Vision group (96.6% vs. 83.3%, P = 0.033). The median time for best glottic view was comparable in both the groups (4.9 vs. 5.2 seconds; P = 0.157), however overall duration for intubation was significantly lesser with I-scope when compared to King Vision (8.2 vs.14.5 seconds; P<0.001). Ease of intubation and success of intubation in neutral position were also significantly better in I-scope group. POGO score was similar in both the groups (Table 1).

DISCUSSION

The present study was conducted on manikin with a simulated restricted mouth opening of 2 cm to compare King Vision video laryngoscope with newly introduced video intubating aid, the I-scope. Both the devices claimed to have an edge in situations where mouth opening is limited.

Intubation characteristics of both the devices were compared. The results showed 100% success rate of intubation with both the devices. Time for best glottic view and POGO score was comparable in both the groups; however, parameters like time of intubation, first attempt success rate, success rate of intubation in neutral position and ease of intubation were significantly better with I-scope when compared to King Vision (Table 1).

Though the time for best glottic view was comparable in both the groups, interestingly the time for intubation was significantly lesser with I-scope. This finding can be explained on the basis of hand eye coordination which is generally needed to perform intubations when using any video intubating device^[6].

Non-channeled or standard blade of King Vision requires as less as 13mm mouth opening for insertion (Figure 1). Insertion into the mouth was not a problem, however insertion of the blade and simultaneous manipulation of endotracheal tube with stylet took extra efforts and time despite visualizing the glottic opening. The process was much simpler with I-scope.

I-scope is just like a normal stylet over which ETT is mounted (Figure 2). As long as an ETT can be inserted, restricted mouth opening is not a problem at all. Additionally, I-scope also

Table 1: Comparison of characteristics of tracheal intubation in both the groups			
Parameters (n=60)	King Vision Group (n=60)	I-Scope Group	P value
Incidence of successful Intubation (%)	60(100%)	60(100%)	1.000
Attempts for successful Intubation (%)			
First	50(83.3%)	58(96.6%)	0.033
Second	08(13.3%)	02(3.3%)	
Third	02(3.3%) 00(0.0%)		
Time of best glottic view (sec) 5.26±1.23			4.93±1.31 0.157
(Mean±SD)			
Time of Intubation (sec) 14.53±2.56	8.24±2.38 <0.001		
(Mean±SD)			
Position for successful Intubation (%)			
Neutral 45(75%)	57(95%) 0.003		
Sniffing 15(25%)	3 (5%)		
Ease of intubation (%)			
Grade1 50(83.3%)	58(96.6%) 0.029		
Grade 2 10(16.6%)	2(3.3%)		
Grade 3 0	0		
POGO score			
1	60(100%)	60(100%)	1.000
2	0	0	
3	0	0	
4	0	0	

The values are number (percent) of patients and were analysed using Fisher's Exact or mean ± SD and analysed using unpaired t test as applicable.



Figure 1. I-scope A. I-scope monitor and Stylet, B. Endotracheal Tube mounted on I-Scope.

provides a real time laryngoscopy and intubation on a video screen and the tip works as a lightly and too giving double aid

to intubation. As soon as a proper glottic view was obtained, intubation was easily carried out by simply advancing the I-scope further into the trachea.

Both the devices being video scopes provide an indirect view on a video screen. Performing intubation while seeing on a video screen requires hand eye coordination. This hand eye coordination was much simpler in case of I-scope as compared with the King Vision video laryngoscope because directing ETT into the trachea with second hand even after a proper glottic view, required more effort and expertise in case of King Vision. Insertion and manipulation of King Vision and ETT separately requires more space when compared to single assembly of I-scope and ETT. This might be the reason that in King Vision group, greater number of intubations required sniffing position.

I-scope if properly angled and prepared may even directly enter the trachea giving a good view of tracheal rings, this double confirms the correct placement of ETT even before capnometry. The simplicity of use of I-scope may explain the findings of this study. The main limitation of this study is that, this is a



Figure 2. King vision video laryngoscope.

manikin study, so we could not compare other parameters like haemodynamic effects, trauma and other airway complications.

CONCLUSION

In cases with limited mouth opening I-scope is helpful in securing the airway quickly and easily, without much learning curve and expertise as compared to king Vision video laryngoscope.

REFERENCES

1. El-Ganzouri AR, McCarthy RJ, Tuman KJ, et al. Preoperative airway assessment: Predictive value of a multivariate risk index. *Anesth Analg.* 1996; 82:1197–204. <https://doi.org/10.1213/00000539-199606000-00017> PMID:8638791
2. Giquello JA, Humbert S, Duc F, Monrignal JP, Granry JC. Use of the air traq by inexperienced physicians supervised during a series of tracheal intubation in adult patient with anticipated difficult airway. *Ann Fr Anesth Reanim.* 2011; 30:804–8. <https://doi.org/10.1016/j.annfar.2011.05.006> PMID:21719241
3. Shah PN, Sundaram V. Incidence and predictors of difficult mask ventilation and intubation. *J Anaesthesiol Clin Pharmacol.* 2012; 28:451–5. <https://doi.org/10.4103/0970-9185.101901> PMID:23225922 PMCid:PMC3511939
4. Ali QE, et al. King Vision video laryngoscope for severe post burn contracture neck: an encouraging experience. *Rev Bras Anesthesiol.* 2015. Available from: <https://doi.org/10.1016/j.bjane.2014.10.006> 1, 2.
5. de Pinho MM, Bastos AM, Fontes CL, et al. Tracheal intubation with King Vision in a patient with oral opening <1 cm: case report. *Eur J Anaesthesiol.* 2014; 31:270. <https://doi.org/10.1097/00003643-201406001-00778>.
6. Levitan RM, Heitz JW, Sweeney M, et al. The complexities of tracheal intubation with direct laryngoscopy and alternative intubation devices. *Ann Emerg Med.* 2011; 57:240–7. <https://doi.org/10.1016/j.annemergmed.2010.05.035> PMID:20674088