

A Prospective Comparative Study of Airtraq Versus King Vision Video Laryngoscope In Patients Undergoing Genral Anaesthesia For Elective Surgery

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Abstract:

Background :Securing the airway with endotracheal tube is one of the most important skill in anaesthesia .The placement of endotracheal tube can be expectedly or unexpectedly difficult or times impossible .Difficult and failed tracheal intubation remains a leading cause of morbidity and mortality in anaesthesia Direct laryngoscopy has been the standard technique for tracheal intubation. Video laryngoscopy is a newer device developed recently for the management of difficult airway. Airtraq is a recent device which provides improved laryngeal visualization ,alignment between the mouth ,larynx and trachea is not necessary, as like direct laryngoscope. King Vision video laryngoscope is a new intubation device that has been developed for the management of normal and difficult airway.

Materials and methods :it's a prospective comparative study done in Meenakshi Mission Hospital and Research centre ,Madurai during period of 1 year ,with a study population of 80 patients who were admitted for elective surgical procederes and fulfilling the inclusion and exclusion criteria were included in the study, they were divided in 2 groups using computer based randomization technique,

Group A:40 patients- intubated with Airtraq

Group K:40 patients -intubated with King Vision video laryngoscope

Outcomes measured

1.Time taken for intubation

2 number of attempts to intubate

3 intubation success rates

4. complications like bleeding and sorethroat

Results :

The time taken for intubation in Group A is more compared to that of Group K with statistically significant p value (<0.05).there was no statistically significant difference between two groups in terms of number of intubation attempts , intubation success rate and complications

Conclusion :

From the current study we conclude that time taken for intubation with Aitraq is significantly more compared to that of King vision video laryngoscope.We also conclude that both Airtraq and King vision video laryngoscope is having similar number of intubation attempts , intubation success rates and its complications.

Key words: Airtraq; Kingvision videolaryngoscope; Intubation;

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I. Introduction

Securing the airway with an endotracheal tube is one of the most important skill in anesthesia. The placement of tracheal tube can be expectedly or unexpectedly difficult or at times impossible. ^[1] Difficult and failed tracheal intubation remains a leading cause of morbidity and mortality in anesthesia. Many difficult intubations are sometimes recognized after induction of anesthesia. ^[2] Direct laryngoscopy has been the standard technique for tracheal intubation. Video laryngoscopy is a newer device developed recently for the management of difficult airway. ^[3] Video laryngoscopes have several advantages over traditional direct laryngoscopy. Video laryngoscopy magnifies the view of airway and allows the operator to view the airway in greater detail. The anterior angulation of the blade aids intubation in people with short neck and anteriorly placed larynx. Placement of the video camera allows multiple clinicians to observe the procedure. ^[3] Video laryngoscopes allow minimal cervical motion for intubation in trauma patients with suspected cervical spine injury. ^[4] Airtraq is a recent device, which provides improved laryngeal visualization, alignment between the mouth, larynx and trachea is not necessary, as like direct laryngoscopy. ^[5] King vision video laryngoscopy is a new intubation

device that has been developed for the management of normal and difficult airway. [4] It is a self-contained battery powered device that uses two types of disposable blades, the non-channeled blade, which requires the use of a stylet to aid tracheal tube placement and a channeled blade, where tracheal tube placement is guided with the channel within the blade. [6]

In a study^[5] conducted by Ali QE et al concluded that king vision is better than Airtraq in view of time to intubate and number of attempts to intubate. And an another study^[7] conducted by Patrick Schoettkar et al concluded that Airtraq- Airview allows faster identification of landmarks than that of high quality king vision video laryngoscope.

Since there were not much of studies comparing Airtraq versus king vision video laryngoscope and also due to different results of above quoted studies, we planned to compare Airtraq versus king vision video laryngoscope to find out the ease of intubation with the objective of Time taken for intubation, Number of attempts to intubate and complications

II. Materials And Methods

Study site: Anesthesia Department, Meenakshi Mission Hospital and Research Centre, Lake area, Madurai

Study population: Patients admitted for elective surgical procedures those who were fulfilling the inclusion and exclusion criteria were included in the study.

Study design: A prospective comparative study.

Study period: February 2019 to October 2019, period for analyzing data was November 2019

Sample size

Sample size was calculated based on previous study done by *QE Ali et al*^[11] with power of 80 and confidence interval 95. The sample size was 80 patients with 40 in each group.

Sample size

Proportion 1	82.1%
Proportion 2	88.9%
Confidence level	95
Power	80
Ratio of sample sizes (n2/n1)	1

Sample size

Sample size Group1 (n1):	40
Sample size Group2 (n2):	40
Total sample size (both groups):	80

$$n = \frac{[Z_{1-\alpha/2} \sqrt{(r+1)p(1-p)} + Z_{1-\beta} \sqrt{rp_1(1-p_1) + p_2(1-p_2)}]^2}{r(p_2 - p_1)^2}$$

Inclusion criteria:

1. Adult patients of both sex with age between 18 to 60 years
2. Patients with ASA I & II
3. Patients undergoing elective surgery under general anesthesia.

Exclusion criteria:

1. Patients with pregnancy
2. Patients with anticipated airway abnormalities
3. Patients with BMI more than 30 kg/m²
4. Patients with Mallampati class III & IV
5. Patients with ASA III & IV

Pre-procedure Assessment:

All patients, those who are fulfilled the inclusion and exclusion criteria were included in the study. All details including Name, Age, Address, Hospital number were recorded. A meticulous airway assessment was done to exclude patients with difficult airway by giving attention to modified Mallampati airway classification, Neck movements, Thyromental distance, Tempero mandibular joint mobility and examination of dentition.

Investigations:

The following investigations were done in all patients: Complete Hemogram
Blood sugar Blood urea Serum creatinine
Coagulation profile(PT, INR, aPTT & Platelet count) Viral markers
ECG

Informed consent:

Patient and relatives were explained about the procedure and expected complications. They were informed about the present study and their eligibility for participating in the study. Only patients who were willing to participate were included and an informed consent was obtained.

Procedure:

Patients were randomly selected based on computerized randomization and were grouped into

- 1) Group A (Airtraq)
- 2) Group K (king vision video laryngoscope)

All standard monitoring devices like ECG, SpO₂ and NIBP were connected at pre anesthetic room and patients were pre medicated with inj Midazolam 1mg intravenously in pre anesthetic room 30 minutes before shifting to operation theatre.

In the operation theatre, the operating table was levelled to the umbilicus of the intubating person and the patients were placed in supine position. Basal heart rate, Mean Arterial Pressure, SpO₂ readings were recorded.

All patients were pre oxygenated with 100% oxygen using closed circuit with 5 lit/min for 3 minutes and induced with inj Fentanyl 2mcg/kg, inj Propofol 2mg/kg and inj Vecuronium 0.1mg/kg. the intubating device and stop watch were prepared at this point and intubation was carried out with respective device.

Group A

Airtraq (Prodol Meditech limited USA) preloaded with endotracheal tube is held in left hand and stop watch started. After opening of the mouth the distal end of blade was introduced in midline. Mild traction of lower jaw was done to allow the channel portion of Airtraq to enter inside the mouth. By looking at the eye piece the Airtraq was gently advanced along the curvature of the tongue until the epiglottis come into the view. Tip of the blade was kept at the vallecula and scope was lifted gently superiorly to view the entire glottis opening. Then the endotracheal tube was threaded down into the trachea. After appearance of ETCO₂ stop watch should be stopped and time taken for intubation noted. In all cases intubation was performed by me, a resident of Anesthesiologist under the guidance of my senior consultant.

Group K

King vision video laryngoscope(King system Corporation USA) connected with channeled blade and preloaded with endotracheal tube held in left hand. It was switched on by pressing the button located over the back of the monitor and stop watch started. After opening of mouth the distal end of blade was introduced in midline. Mild traction of lower jaw was done to allow the channel portion of the blade to enter inside the mouth. By looking onto the display, the scope was gently advanced along the curvature of the tongue until the epiglottis come into the view. Tip of the blade was kept at the vallecular and the scope was lifted gently superiorly to view the entire glottis opening. The image of glottis was placed at the center of the display with care taken not to get a very close view, because it causes difficulty in passing the tube due to arytenoid catch. Then the endotracheal tube was threaded down into the trachea. After appearance of ETCO₂ stop watch should be stopped

and time taken for intubation noted. For obtaining image of the vocal cords, up and down, medial to lateral, right to left tilt, in and out, inward and outward rotation of scope was done. In all cases intubation was performed by me a resident of Anesthesiology under the guidance of my senior consultant.

PARAMETERS OBSERVED

Primary Objective

- 1) Time taken for intubation

Time taken for intubation is defined as the time from the insertion of laryngoscope into the oropharynx till the appearance of ETCO₂ on the monitor.

Secondary Objectives

- 2) Number of attempts to intubate

An attempt to intubate will be considered as the placing of the tube within the oropharynx with an attempt to pass the endotracheal tube.

- 3) Intubation success rate

Successful intubation is considered as proper placement of tracheal tube with selected technique within 2 attempts. If not possible within two attempts, it was considered as a failed intubation.

- 4) Complications

a. Bleeding was considered as presence of blood at the tip of laryngoscope blade & oral cavity after intubation.

b. Sore throat was considered as patient complaining of pain in the throat after extubation in first 24 hrs.

Sampling procedure

Computer based randomization generated by the open Epi Random Program.

Group A: 1, 2, 4, 5, 7, 8, 9, 11, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 29, 31, 32, 33, 35, 36, 38, 39, 44, 47, 51, 55, 56, 59, 62, 65, 68, 72, 75, 78

Group K: 3, 6, 10, 14, 17, 20, 23, 26, 30, 34, 37, 40, 41, 42, 43, 45, 46, 48, 49, 50, 52, 53, 54, 57, 58, 60, 61, 63, 64, 66, 67, 69, 70, 71, 73, 74, 76, 77, 79, 80

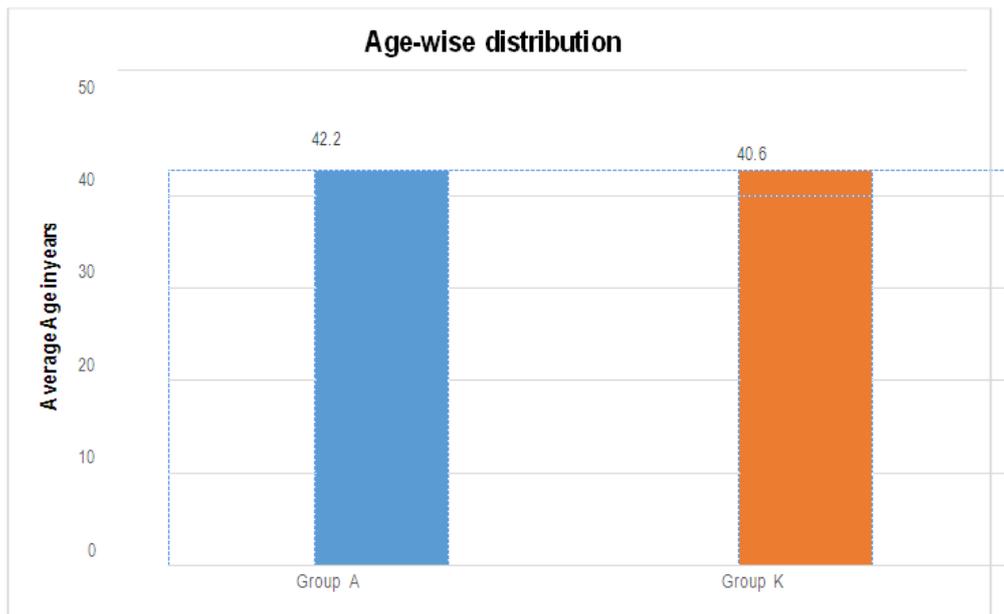
Statistical tools

The information collected regarding all the selected cases was recorded in a master chart in excel sheet. The statistical analysis was done with the help of computer using SPSS-20 and Minitab-17. Using the software, measurements of central tendency, measures of dispersion, 't' value, chi square and analysis of variance(ANOVA) test, 'p' values were calculated. 't' test was used to test the significance of difference between quantitative variables. Yate's and Fisher's chi square test for qualitative variables. A 'p' value less than 0.05 was considered as significant relationship.

ETHICAL CONSIDERATION

This study does not include any experimentation. Patients were informed of the procedure done and consent was obtained. No one was receiving any benefit personal or professional from a commercial party directly or indirectly to the subject of this study.

Graph 1: Average Age (In Years)



III. Results

80 Patients aged between 18 and 60 years belonging to ASA grade I & II posted for elective surgery under general anesthesia were included in the study was to compare the ease of intubation between Airtraq and King vision videolaryngoscope.

DEMOGRAPHIC DATA

Table 1: Age distribution

Variable	Group	Mean	SD	P-Value
Age(in years)	A	42.2	12.2	0.560 NS
	K	40.6	11.9	

Inference:

The mean age of patients in group A was 42.2±12.2 and in group K was 40.6±11.9. There was no statistically significant difference in the age between the two groups(p=0.560).

Graph 2: Sex-wise distribution

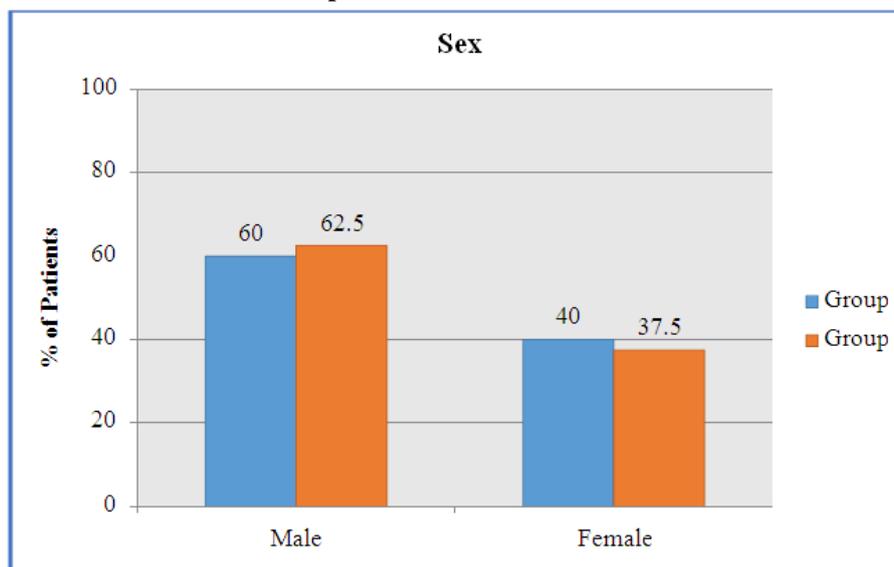


Table 2: Sex distribution

Variable		Group		P-Value
		A	K	
Sex	Male	24	25	0.818 NS
		60.0%	62.5%	
	Female	16	15	
		40.0%	37.5%	

Inference:

In group A, 60% were male and 40% were female. In group K, 62.5% were male and 37.5% were female. There was no statistically significant difference between the two groups(p=0.818).

Graph 3: ASA Grade



Table 3: ASA grade

Variable		Group		Total
		A	K	
ASA Grade	I	14	16	0.644 NS
		35.0%	40.0%	
	II	26	24	
		65.0%	60.0%	

Inference:

35% of group A and 40% of group K were ASA grade I. 65% of group A and 60% of group K were ASA II. There was no statistically significant difference between the groups(p=0.644).

Graph 4: Number of attempts to intubate

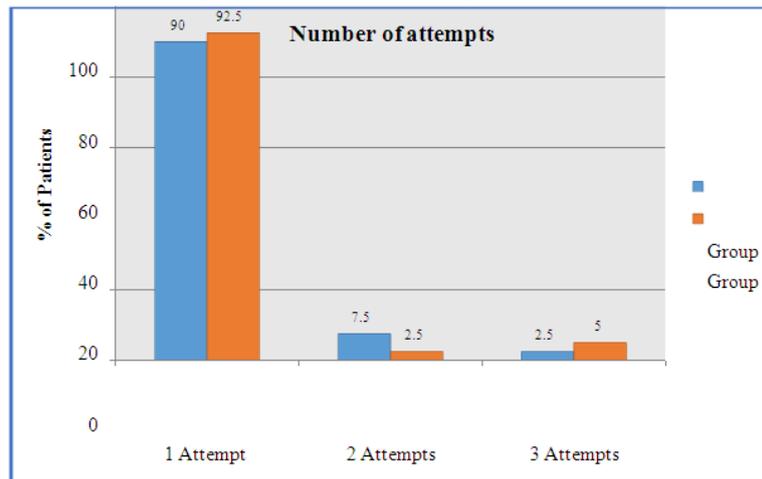


Table 4: Number of attempts to intubate

Variable		Group		P-Value
		A	K	
No of attempts to intubate	1	36	37	0.510 NS
		90.0%	92.5%	
	2	3	1	
		7.5%	2.5%	
	3	1	2	
		2.5%	5.0%	

Inference:

90% of group A and 92.5% of group K was intubated in first attempt. 7.5% of group A and 2.5% of group K was intubated in second attempt. 2.5% of group A and 5% of group K was intubated in third attempt. There was no statistically significant difference between the two groups (p=0.510).

Graph 5: Time taken for intubation in seconds

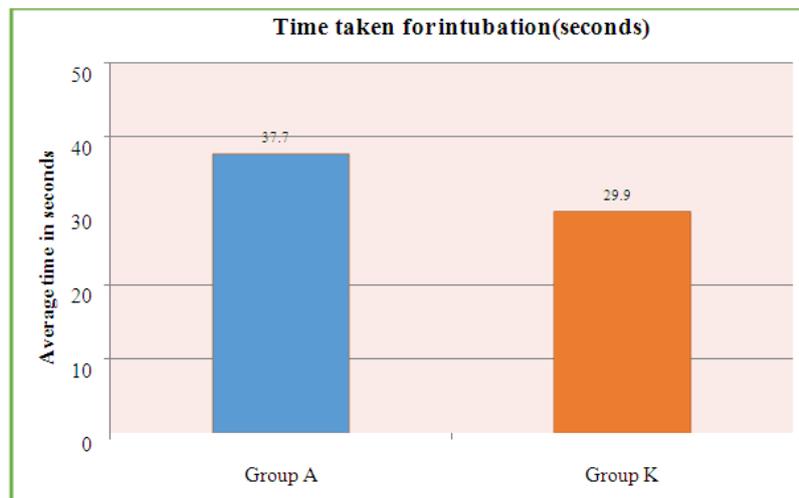


Table 5: Time taken for intubation:

Variable	Group	Mean	SD	P-Value
Time taken for Intubation (seconds)	A	37.7	4.6	0.001 Sig
	K	29.9	7.4	

Inference:

The time taken for intubation in group A is 37.7 ± 4.6 and time taken for intubation in group K is 29.9 ± 7.4 . There was significantly longer time taken for intubation in A group compared to K group with p value of 0.001.

Graph 6: Intubation success rate

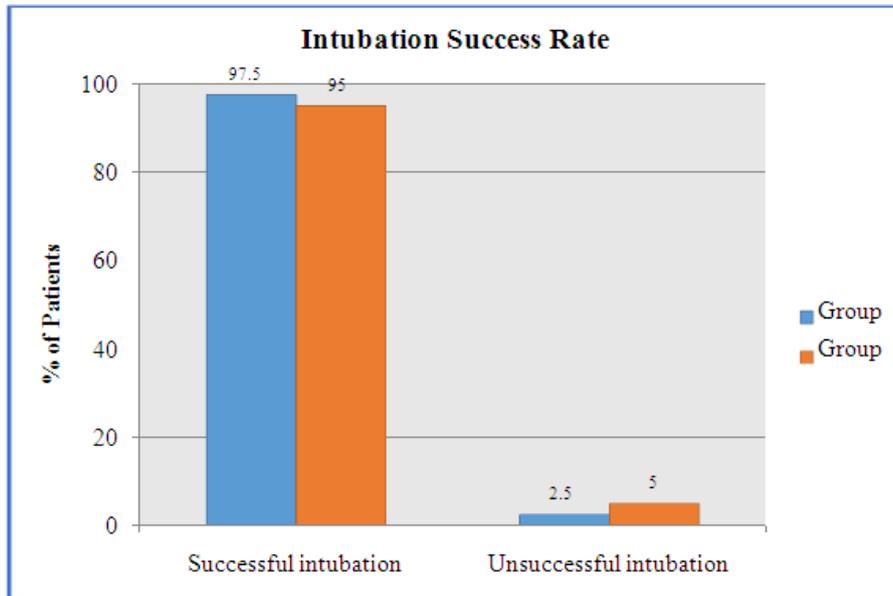


Table 6: Intubation success rate

Variable		Group		P-Value
		A	K	
Successful Intubation	Yes	39	38	0.566 NS
		97.5%	95.0%	
	No	1	2	
		2.5%	5.0%	

Inference:

There was 97.5% of patients had successful intubation in group A and 95% of patients had successful intubation in group K. There was no statistically significant difference between two group. ($p = 0.566$)

Graph 7: Complications

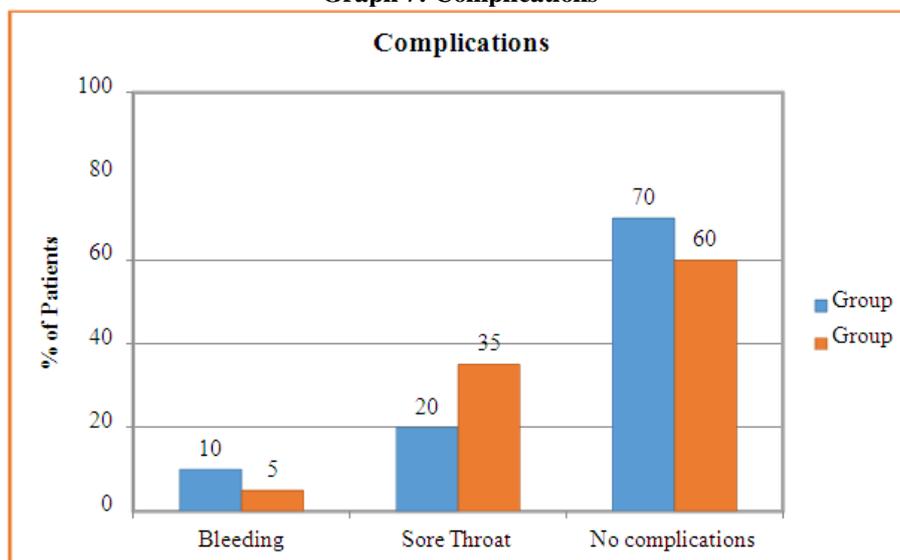


Table 7: Complications

Variables	Group			
	A		K	
	Number	%	Number	%
Bleeding	4	10.0	2	5
Sore Throat	8	20	14	35
Total number of cases with complications	12	30	16	40
Patients with no complications	28	70	24	60
P value	0.271			

Inference:

Total percentage of complications in Airtraq was 30% and in king vision video laryngoscope was 40%. There was no statistically significant difference between the two groups(p=0.271).

IV. Discussion

The leading cause of anesthesia related complication is the inability to intubate the trachea and secure the airway. [5]

The Airtraq is a new single use laryngoscope designed to facilitate tracheal intubation in patients with both normal and difficult upper airway anatomy. [6]

King vision video laryngoscope is an indirect, optical laryngoscope that has been designed to provide a view of the glottis without alignment of the oral pharyngeal and tracheal axes. [1]

In our study we compared between Airtraq and King vision video laryngoscope in terms of time taken for intubation, number of intubation attempts, intubation success rate and complications.

TIME TAKEN FOR INTUBATION

In our study time taken for intubation in Airtraq was 37.7±4.6seconds and the time taken for intubation in king vision video laryngoscope was 29.9±7.4 seconds. Airtraq took longer time to intubate when compared with king vision video laryngoscope and it was statistically significant (p=0.001).

NUMBER OF ATTEMPTS TO INTUBATE

In our study 90% of patients in group A were intubated in first attempt and 92.5% of patients in group K were intubated in first attempt. 7.5% of patients in group A and 2.5% of patients in group K were intubated in second attempt. 2.5% of patients in group A and 5% of patients in group K were intubated in third attempt. There was no statistically significant difference in two groups in terms of number of intubation attempts (p=0.510).

INTUBATION SUCCESS RATE

In our study intubation success rate of group A was 97.5% and intubation success rate of group K was 95%. There was 2.5% failure in group A and 5% failure in group K. There was no statistically significant difference between two groups in terms of intubation success rate(p=0.566)

COMPLICATIONS

In our study 10% of patients had bleeding and 20% of patients had sore throat in group A, 5 % of patients had bleeding and 35% of patients had sore throat in group K. Totally there were 30% of patients had complications in group A and 40% of patients had complications in group K, but there was no statistically significant difference in both groups.

V. Conclusion

From the current study we conclude that time taken for intubation with Airtraq is significantly more compared to that of King vision video laryngoscope. We also conclude that both Airtraq and King vision video laryngoscope is having similar number of intubation attempts, intubation success rate and its complications.

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