



COMPARATIVE EVALUATION OF VIDEO LARYNGOSCOPY AND CONVENTIONAL LARYNGOSCOPY GUIDED INTUBATION IN CERVICAL SPINE INJURY PATIENTS UNDERGOING ANTERIOR CERVICAL DISCECTOMY AND FUSION SURGERY UNDER GENERAL ANESTHESIA

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ABSTRACT**Aims-** To evaluate the safety and efficacy of Video laryngoscope as compared to conventional laryngoscope for intubation in cervical spine injury patients undergoing anterior cervical discectomy and fusion surgery under general anaesthesia.**Materials and Methods-** After ethical committee approval and written informed consent 100 adult patients with cervical spine injury posted for ACDF surgeries were taken up for study and divided in two study groups. Standardized anaesthesia technique was used. For both the groups IDS score, time of intubation, hemodynamic parameters and degree of neck movement were recorded. **Observations-** Video laryngoscope shows better overall IDS score and better grading of IDS as compared to Conventional laryngoscope. Duration of intubation is significantly less with Conventional laryngoscope as compared to Video laryngoscope. **Conclusion-** Intubation with Video Laryngoscope provides better glottis view and IDS score as compared to conventional laryngoscope at relatively less degree of neck movement, though the time taken required for intubation is slightly more with the use of video laryngoscope.**KEYWORDS :** Laryngoscope, ACDF, Intubation.**AIMAND OBJECTIVES**

- To evaluate the safety and efficacy of Video laryngoscope as compared to conventional laryngoscope for intubation in with cervical spine injury patients posted for ACDF surgery under general anaesthesia.
- Primary objective- to compare intubation difficulty scale (IDS) score between both the groups.
- The Secondary objectives are –
- To compare the time taken for intubation.
- To compare Hemodynamic Parameters before and after intubation.
- Degree of neck movement.

MATERIALAND METHODS**Study Population-** After institutional ethical committee approval and written informed consent 100 adult patients with cervical spine injury from both the sexes, of ASA grade I and II, between the age of 18 to 65; posted for ACDF surgeries were taken up for study. The study was conducted over a period of 1 year (July 2023 to June 2024.)**Sample Size and Sample Technique-** 100 patients were taken and were allocated in the two groups using random number table. For both the groups intubation was done in the ideal situation required for the intubation for that particular device. In both the groups premedication was done with Inj Glycopyrrolate (0.02 mg/kg) and Inj Fentanyl (2 mcg/kg) iv 5 minutes before procedure. In the operation theater after proper positioning, induction was done by Inj. Propofol (2mg/kg body weight) and muscle relaxation was achieved by Rocuronium Bromide (1.5 mg/kg). Tracheal intubation was done after 120 secs of bag and mask ventilation after Inj Rocuronium Bromide.

- Group C- intubated by using Conventional Laryngoscope.
- Group V- intubated by using Video Laryngoscope.

Manual in-line stabilization was done in all the cases to prevent and minimize any degree of neck movement. Successful intubation was confirmed by chest auscultation and end-tidal CO₂ graph. For both the groups IDS score, time of intubation, hemodynamic parameters and degree of neck movement were recorded.

Statistical Analysis

Data was presented in terms of frequency and percentage for qualitative (categorical) variable and for quantitative variables, data was presented in terms of range (min, max), mean, SD. Median (Inter quartile range) in case data do not follow a normal distribution for both the groups separately.^[1,2]

The Quantitative variables like Degree of neck movement, Time, BP, HR were calculated by Student t Test and Mann Whitney Test while Qualitative variables like IDS score was by Chi-square and Fischer Exact Test.^[2,3]

ANOVA with repeated measures will be applied to see overall significance (inter and intra) for quantitative variables and the level of significance will be taken as $p \leq 0.05$ and the data will be analyzed by

using SPSS statistical software version 20.

OBSERVATIONSAND RESULTS

Our two study groups were comparable on baseline characteristics age, weight, gender and ASA physical status. Both the groups had patients with comparable MMPG airway assessment scores and were similar with respect to mouth opening and upper lip bite test.

Intubation Difficulty Scale (IDS) Score

The mean IDS in C group were 0.11 and SD was 0.23. While in V group mean was 0.30 and SD 0.48. p value = 0.0142 which implies significant difference between the two groups regarding IDS score.

Table 1 : IDS Score Classification Among Groups

IDS Score	C	V	Total
0	40	46	86
1	6	2	8
2	4	2	6
Total	50	50	100

p-value = 0.0142(significant)

Intubation difficulty score = sum of all the seven parameters.

Table 2 : Grading of IDS Score Among Groups

Group	C	V	Total	p-value
Easy (IDS=0)	42	46	88	0.002
Moderate (IDS=1-5)	8	4	12	0.016
Difficult (IDS>5)	0	0	0	NA

Individual Parameter Of The Intubation Difficulty Scale (IDS)**Number of Additional Intubation Attempts- N1**

p value is 0.003, which indicates the difference in intubation attempts in the two groups is highly significant statistically 44 patients of group C and 47 patients of group V were intubated in the first attempt. 6 patient in group C and 3 patients in group V required more than 1 attempt.

Number of Additional Operator – N2

All the patients in both C and V group were intubated by the first operator. So there is no any significant difference between the two groups regarding number of additional operators.

Number of alternative techniques used-N3 p value was 0.005 (statistically significant.)

Glottic Exposure (Cormack – Lehan grade) – N4

All the patients in both the groups had good glottis view during intubation with both the intubating devices. None of the patients in both the groups had Cormack Lehan Grade more than 1.

Subjective Measure of Lifting Force – N5

In both the groups no any patient required any lifting force during intubation.

Necessity of Applied External Laryngeal Pressure for Optimizing

the Glottis Exposure – N6

External laryngeal pressure was required in only 8 patients during intubation with conventional laryngoscope. But external laryngeal force was required in 3 patients of Group V during intubation with video laryngoscope. p value 0.0041.

Position of Vocal Cords N7

In all patients vocal cords were abducted. Therefore, it shows no significant difference between the two groups in terms of position of vocal cords during intubation.

Time Required for Intubation

Mean duration of intubation in group C was 9.20 seconds with SD of 1.48 where as in group V it was 18.32 seconds with SD 5.02. p value was <0.001 which shows the difference is highly significant statistically.

Table 3: Comparison of Time Required for Intubation

Variable	Group	MeanSD	P-value
Time of intubation	C	9.201.48	<0.001
(in sec)	V	18.325.02	

Hemodynamic Changes

Hemodynamic instability was seen more with Video laryngoscope than conventional laryngoscope. In both the groups HR increased significantly at 1st and 3rd min of intubation and return to normal at 5th min after intubation. But comparing the increase in HR between both the devices for 1st min we found that the difference was significant and conventional laryngoscope showed better results than Video laryngoscope. In both the groups significant increase in the MAP was noted at 1st min of intubation. In group C, MAP came to pre intubation level at 2nd min of intubation, while in group V MAP came to pre intubation level at 3rd min of intubation. On statistical analysis, we found significant difference between the two groups.

Degree Of Neck Movement

Comparing the degree of neck movement during laryngoscopy and intubation we found that in Group C mean neck movement in degree was 1.57° with SD 2.16, while in Group V mean movement was 0.65° with SD 0.45. The results clearly showed that neck movement was more during intubation with conventional laryngoscope compare to video laryngoscope. But after applying the Mann Whitney U Test, p value came to be 0.0013 which shows no significant difference between the two groups.

Table 4: Comparison of Degree of Neck Movement

Variable	Group	MeanSD	P-value
Degree of Neck movement	C	1.572.16	0.0013
	V	0.650.45	

DISCUSSION

Airway management is of prime importance in administration of general anaesthesia. Conventional direct laryngoscopy has been used since times immemorial for endotracheal intubation^[1,3]. Video laryngoscope offers an advantage of better glottis view in reduced mouth opening patients or patients with restricted cervical spine movement. Video laryngoscope though a newer modality requires far less expertise and can be used for training purpose^[5].

In our study mean time required for intubation with conventional laryngoscope was 9.201.48 sec while for Video laryngoscope was 18.325.02 sec. Considering heart rate and BP fluctuations Conventional laryngoscope showed better results than Video laryngoscope. The haemodynamic fluctuations seem to be directly related to the time required for intubation. The ease and acceptance of conventional laryngoscope was far more for the operators compared to video laryngoscope. And hence the operators were more comfortable and had more hands on experience with conventional laryngoscope as compared to video laryngoscope which happens to be a relatively newer technology.

Martinez and Alvarez et al.^[2,3] on their study on 200 subjects with reduced mouth opening and difficult airway observed that the rate of successful intubation in first attempt and without use of a second operator or alternative technique or external laryngeal pressure was significantly more with video laryngoscope as compared to conventional laryngoscope. The time required for intubation was more with video laryngoscope and so was the haemodynamic instability associated with it. The results of this study were consensus with our

study and study done by Rodri et al.^[1,4]

Zuccini et al^[5] in a similar study done on 250 subjects with less than 2 finger breath mouth opening concluded that better glottis visibility and CL grading was observed with use of video laryngoscope than with conventional laryngoscope.

E. Fernandez and N. Williams et al^[2,3] in their study on traumatic cervical spine injury patients observed that with application of manual inline stabilization neck movement associated with intubation was significantly less with video laryngoscope as compared to conventional laryngoscope.

RESULTS

Intubation difficulty scale (IDS) score, Hemodynamic parameters, duration of intubation and neck movement were compared among the two groups C and V.

1. There was significant difference between the two groups with regard to overall IDS score and grading of IDS score.
2. Intubation with Video laryngoscope is as easy as Conventional laryngoscope.
3. On comparison of individual parameters of IDS score we found that video laryngoscope stands better than conventional laryngoscope with respect to requirement of additional attempts for intubation, requirement of alternate technique for intubation and requirement of external laryngeal pressure during intubation; video laryngoscope stands better than conventional laryngoscope. For rest of the parameters of IDS score both the intubating devices showed equal results.
4. Regarding the time required for intubation, conventional laryngoscope showed better results than video laryngoscope. Mean time required for intubation with conventional laryngoscope was 9.201.48 sec while for Video laryngoscope was 18.325.02 sec.
5. Hemodynamic instability was seen more with Video laryngoscope than conventional laryngoscope. In both the groups HR increased significantly at 1st to 3rd min of intubation and return to normal at 5th min after intubation. But comparing the increase in HR between both the devices for 1st min we found that the difference was significant and conventional laryngoscope showed better results than Video laryngoscope.
6. In both the groups significant increase in the MAP was noted at 1st min of intubation. In group C, MAP came to pre intubation level at 2nd min of intubation, while in group V MAP came to pre intubation level at 3rd min of intubation. On statistical analysis, we found no significant difference between the two groups.
7. Degree of neck movement was relatively more in conventional laryngoscope group.

CONCLUSION

1. Video laryngoscope shows better overall IDS score and better grading of IDS as compared to Conventional laryngoscope. During comparison with individual parameters of IDS score, Video laryngoscope showed better outcome in view of number of additional attempts and requirement of alternate technique for intubation.
2. Hemodynamic pressure responses are not significantly different in Video laryngoscope and Conventional laryngoscope.
3. Duration of intubation is significantly less with Conventional laryngoscope as compared to Video laryngoscope.
4. There is no significant difference regarding degree of neck movement between both the groups.

Limitations

1. Our study was done on a small number of cases (50 patients in each group). Larger sample sizes are required to be studied over a longer period of time to validate our results and extrapolate the results to the whole population.
2. Our study includes patients with only cervical spine injuries. Our study excluded patients with anatomically difficult airways, patients with reduced mouth opening undergoing ACD. So this limits the extrapolation of the results to patients undergoing other surgeries. Hence, true utility of a video laryngoscope cannot be commented on.
3. Our study excludes patients with ASA grade 3 and 4 patients, patients of age below 18 yr and above 65 yr, so this limits the extrapolation of the results to those category of patients.
4. The study was conducted only in the operation theater and on the patients who were well prepared for surgery, so the results cannot

be extrapolated to the general population and the patients in emergency scenarios.

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