# Comparison of Video Laryngoscopy Versus Direct Laryngoscopy for Orotracheal Intubation among Adults in Emergency Department

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## ABSTRACT

**Introduction:** Video laryngoscopy for intubation has increased in frequency and there is mounting evidence suggesting increased first pass success, improved glottic view and fewer adverse events with its use. This study compared Video laryngoscopy and direct laryngoscopy with respect to first-pass intubation success and adverse events in an emergency department setting.

**Methods:** A prospective, comparative study was done at Emergency department of Patan Academy of Health Sciences with sample size of 63 in each group, with total of 126 patients. Multivariable logistic regression was performed to assess the independent association between laryngoscopy technique and first-pass success after adjustment for age, sex, anticipated difficult airway, and Cormack–lehane grade.

**Results:** First-pass success was achieved in 44 (69.84%) patients in the Video laryngoscopy group and 38 (60.32%) in the direct laryngoscopy group (p=0.350). Adverse events occurred in 50 (79.37%) patients in the Video laryngoscopy group and 48 (76.19%) in the direct laryngoscopy group. Hypoxemia was present in both groups. After adjustment for patient and airway characteristics, Video laryngoscopy was not independently associated with first-pass success (adjusted OR 1.38, 95% CI 0.63–3.01; p=0.422), whereas CL Grade III–IV was associated with lower odds of first-pass success (adjusted OR 0.34, 95% CI 0.14–0.82; p=0.016).

**Conclusions:** Video laryngoscopy showed a numerically higher first-pass success rate than direct laryngoscopy, but this difference was not significant after adjustment for patient and airway characteristics. Difficult laryngoscopic view was independently associated with lower first-pass success, supporting the use of both techniques according to individual patient and airway characteristics.

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## INTRODUCTION

Intubation is a core skill in the emergency department and is a lifesaving procedure. Historically, direct laryngoscopy has been the standard method and most commonly used device for management of airway in emergency. However, it may not always lead to successful intubation as the visualization of glottis requires the proper alignment of the laryngeal, pharyngeal and oral axis.[1]

Video laryngoscopes are being used in increased frequency over the past 20 years and has been shown to improve the glottic view.[2] Obtaining a view of the larynx may be easier with a video laryngoscope compared with a direct laryngoscope as the camera is located near the tip of the laryngoscope blade.[3,4] There is mounting evidence suggesting increased first pass success, improved glottic view and fewer adverse events with its use.[5] This benefit was pertinent even when intubation via video laryngoscopy(VL) of all designs were compared with direct laryngoscopy(DL) using augmentation like ramping, bougie or external laryngeal manipulation.[5,6,7]

Hence, this study aims to compare these two techniques in our setting with regard to first pass success and adverse events during airway management as the outcome of either procedure.



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## METHODS

This is a single center, prospective, comparative, observational study conducted in the Emergency Room in the Department of General Practice and Emergency Medicine, Patan Hospital, Patan Academy of Health Sciences (PAHS).The duration of study was 1 year effective from January 2024 to December 2024. The hypothesis of the study is Video Laryngoscopy has better first pass success rate than Direct laryngoscopy during orotracheal intubation whereas the null hypothesis is that there is no difference in first pass success rate with video laryngoscopy as compared to Direct laryngoscopy during orotracheal intubation.

Ethical clearance from Institutional Review Committee (IRC), PAHS was taken before commencing the study (ref no. drs2402021836). All consecutive patients presenting in the Emergency medicine room requiring intubation, were recruited in this study after taking informed written consent from the patients' family, excluding those falling in exclusion criteria. Direct laryngoscopy was done by Mackintosh Laryngoscope with blade no 3 or 4. Video Laryngoscopy was done by Anesthesia Video Laryngoscope, Model YS-IR with blade size 3 or 4 and Direct laryngoscopy was done by Mackintosh Laryngoscope in respective groups. Intubations were done by ER physicians and Emergency fellows of the Emergency department.

Sample size in each arm was determined by using the odds ratio of successful first pass intubation between VL and DL group as reported in study published in annals of American Thoracic society. At 80% power and 5% level of significance, the odds of success rate of first pass intubation between VL and DL group of 2.8 was used.[8]Minimum sample size in each group was 63 in each arm with a total of 126 samples were included in the study. Demographic and clinical profile of patients in both arms were recorded. Two treatment groups were: A- Orotracheal intubation done by Direct Laryngoscopy and Group B- Orotracheal intubation done by Video Laryngoscopy. The choice of laryngoscopy technique was determined by the treating physician and availability of the laryngoscopy device at the time of intubation. Patients were categorized into the video laryngoscopy (VL) or direct laryngoscopy (DL) group according to the technique used.

All the patients in emergency who required intubation and falling into the inclusion criteria were assessed. Informed written consent was taken from the patient's family explaining that they will be a part of study and either of the laryngoscopy methods will be used in them. Informed consent was taken by one of the investigators, (ER physicians and emergency medicine fellow) performing intubations in them. The inclusion criteria were age> 18 years, patients requiring orotracheal intubation and those who give written informed consent. Intubation done in pregnant population and other intubations done by medical officers were excluded from the study.

Data was entered in EPI-INFO version 7.2.6 and Microsoft Excel 2021 and analyzed in EPI-INFO 7.2.6 and R 4.3.3. Categorical variables were compared between the video laryngoscopy and direct laryngoscopy groups using Fisher's exact test. Continuous variables were compared using the independent-samples t-test according to distribution. A P-value of 0.05 or less was considered significant.

## RESULTS

A total of 126 patients undergoing orotracheal intubation were included in the study. Among them, 63 patients underwent intubation using direct laryngoscopy (DL) and 63 patients underwent intubation using video laryngoscopy (VL). The study population included both male and female patients with ages ranging from 18 to 93 years. The baseline characteristics and airway assessment of patients undergoing orotracheal intubation are shown in (Table 1).

First-pass success was achieved in 44 (69.84%) patients in the VL group and 38 (60.32%) patients in the DL group (OR 1.52, 95% CI 0.73-3.19; Fisher's exact test, p=0.350). Among male patients, the first-pass success rate was 26 (76.47%) with VL and 25 (65.79%) with DL (p=0.437). Among female patients, the first-pass success rate was 17 (58.62%) with VL and 13 (52.00%) with DL (p=0.586). Patients aged greater than 60 years had first-pass success rates of 23 (71.88%) with VL and 13 (52.00%) with DL (p=0.169). In the 40–60 years age group, the first-pass success rates were also reported for VL and DL (p=0.525). Among patients younger than 40 years, the first-pass success rate was 10 (71.43%) with VL and 13 (86.67%) with DL (p= 0.390) (Table 2).

**Table 1. Baseline Characteristics and Airway Assessment of Patients Undergoing Orotracheal Intubation (N=126)**

| Variable | Video Laryngoscopy (n=63) n(%) | Direct Laryngoscopy (n=63) n(%) | Total (N=126) | P Value |
|---|---|---|---|---|
| Male | 34(53.97) | 38(60.31) | 72 (57.14) | 0.499 |
| Female | 29(46.03) | 25(39.68) | 54 (42.86) | |
| Mean Age / SD | 56.59 ± 19.79 | 54.73 ± 18.75 | 55.66 ± 19.22 | 0.590 |
| Anticipated difficult airway | 25(39.68) | 27(42.86) | 52 (41.27) | 0.857 |
| No anticipated difficult airway | 38(60.32) | 36(57.14) | 79 (58.73) | |
| CL Grade I | 24(38.10) | 16(25.40) | 40 (31.75) | 0.090 |
| CL Grade II | 27(42.86) | 26(41.27) | 53 (42.06) | |
| CL Grade III | 12(19.05) | 17(26.98) | 29 (23.01) | |
| CL Grade IV | 0 (0.00) | 4(6.35) | 4(3.17) | |

In multivariable logistic regression adjusting for age, sex,


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anticipated difficult airway, and Cormack–Lehane grade (I–II vs III–IV), video laryngoscopy had an adjusted OR of 1.38 (95% CI, 0.63–3.01; p=0.422) for first-pass intubation success. Cormack–Lehane grade III–IV had an adjusted OR of 0.34 (95% CI, 0.14–0.82; p=0.016) for first-pass intubation success (Table 3).

Adverse events were observed in 50 (79.37%) patients in the VL group. Hypoxemia occurred in 36 (57.14%) patients, metabolic complications in 17 (26.98%), and hypotension in 13 (20.63%). Adverse events were observed in 48 (76.19%) patients in the DL group. Hypoxemia occurred in 26 (41.27%) patients, hypotension in 15 (23.81%), and aspiration in 11 (17.46%) (Table 4).

**Table 2. Comparison of First-Pass Intubation Success Between Video and Direct Laryngoscopy According to Demographic Characteristics. (N=126)**

| Variable | Video Laryngoscopy n/N (%) | 95% CI | Direct Laryngoscopy n/N (%) | 95% CI | P value |
|---|---|---|---|---|---|
| Overall | 44/63 (69.84) | 57.0–80.8 | 38/63 (60.31) | 47.2–72.4 | 0.350 |
| Male | 26/34 (76.47) | 58.8–89.3 | 25/38 (65.78) | 48.6–80.4 | 0.437 |
| Female | 17/29 (58.62) | 40.6–78.5 | 13/25 (52.00) | 31.3–72.2 | 0.586 |
| Age <40 years | 10/14 (71.42) | — | 13/15 (86.66) | — | 0.390 |
| Age 40–60 years | 11/17 (64.70) | — | 12/23 (52.17) | — | 0.525 |
| Age >60 years | 23/32 (71.87) | — | 13/25 (52.00) | — | 0.169 |

**Table 3. Multivariable Logistic regression analysis of factors associated with first- pass intubation success**

| Variable | Adjusted OR | 95% CI | P value |
|---|---|---|---|
| Video vs direct laryngoscopy | 1.38 | 0.63–3.01 | 0.422 |
| Age (per year) | 0.99 | 0.97–1.01 | 0.239 |
| Female vs male | 0.49 | 0.22–1.11 | 0.088 |
| Anticipated difficult airway | 0.86 | 0.39–1.93 | 0.718 |
| CL Grade III–IV vs I–II | 0.34 | 0.14–0.82 | 0.016 |

## DISCUSSION

In this study, first-pass intubation success was numerically higher with video laryngoscopy (VL) than with direct laryngoscopy (DL), with success rates of 69.84% and 60.32%, respectively. However, this difference was not statistically significant (p=0.350). Furthermore, after adjustment for age, sex, anticipated difficult airway, and Cormack–Lehane (CL) grade, VL was not independently associated with first-pass intubation success compared with DL (adjusted OR 1.38, 95% CI 0.63–3.01; p=0.422). These findings suggest that the observed unadjusted difference in first-pass success should be interpreted cautiously and differences in airway characteristics between the two groups may be the possible cause for that.

**Table 4. Adverse Events Associated with Video and Direct Laryngoscopy**

| Adverse Event | Video Laryngoscopy n (%) | Direct Laryngoscopy n (%) | p-value |
|---|---|---|---|
| Hypoxemia | 36 (57.14) | 26 (41.27) | 0.108 |
| Hypotension | 13 (20.63) | 15 (23.81) | 0.831 |
| Aspiration | 10 (15.87) | 11 (17.46) | 1.000 |
| Metabolic complication | 17 (26.98) | 8 (12.70) | 0.073 |
| Cardiac arrest | 6 (9.52) | 4 (6.35) | 0.744 |
| Failure to intubate | 4 (6.35) | 5 (7.94) | 1.000 |
| Trauma | 1 (1.59) | 2 (3.17) | 1.000 |
| Arrhythmia | 0 (0.00) | 2 (3.17) | 1.000 |

There was an imbalance in the distribution of CL grades between the study groups. CL Grade I, representing an easier laryngoscopic view, was more frequent in the VL group than in the DL group (38.10% vs. 25.40%), whereas CL Grade IV was observed only in the DL group (0.00% vs. 6.35%). Although the overall difference in CL-grade distribution was not statistically significant, this imbalance is clinically relevant because laryngoscopic view is an important determinant of intubation success. In the adjusted analysis, a more difficult laryngoscopic view (CL Grade III–IV) was independently associated with lower odds of first-pass success (adjusted OR 0.34, 95% CI 0.14–0.82; p=0.016). Therefore, the greater proportion of easier laryngoscopic views in the VL group may have contributed to the higher unadjusted first-pass success observed with VL. This potential baseline imbalance represents an important consideration when interpreting the comparison between the two devices.

Our findings are broadly consistent with previous studies reporting improved or comparable first-pass success with VL compared with DL in critically ill and emergency patients.[8–12] Visualization of the glottis during direct laryngoscopy traditionally requires alignment of the oral, pharyngeal, and laryngeal axes.[13] VL incorporates a camera near the distal portion of the blade, providing indirect visualization of the glottis and potentially improving laryngeal visualization.[14] A systematic review and meta-analysis comparing VL with DL reported improved first-attempt success with VL (RR 1.12, 95% CI 1.04–1.21).[9] However, other systematic reviews and meta-analyses have not demonstrated a consistent advantage of VL over DL for first-pass success.[15,16] Differences in patient populations, operator experience, supervision of trainees, device characteristics, airway difficulty, and clinician familiarity with VL may contribute to this heterogeneity.


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In the present study, the subgroup findings according to CL grade also require cautious interpretation. VL was associated with higher first-pass success in patients with a CL Grade I view, whereas DL showed a higher success rate among patients with a CL Grade III view. These subgroup observations should not be interpreted as evidence that DL is superior for difficult airways because the number of patients in the individual CL-grade categories was small. Moreover, the overall imbalance in CL grades between the two groups and the small number of patients with CL Grade IV limit the reliability of device-specific comparisons within individual grades. The adjusted analysis provides stronger evidence that increasing airway difficulty, rather than laryngoscopy device alone, was associated with reduced first-pass success.

Among patients with an anticipated difficult airway, first-pass success was broadly similar between VL and DL. In patients without an anticipated difficult airway, first-pass success was numerically higher with VL. Previous studies have reported improved first-pass success with VL across different difficult-airway characteristics, potentially because of improved glottic visualization.[4] However, these subgroup findings in the present study should be considered exploratory because the study was not powered to detect differences within these subgroups.

Age-related analysis showed a numerically higher first-pass success with VL among patients older than 60 years (71.88% vs. 52.00%). However, this difference was not statistically significant (p=0.169), and no statistically significant difference was observed in the other age groups. Therefore, the apparent difference among older patients should be interpreted as a descriptive finding rather than evidence of an age-specific benefit of VL.

Regarding adverse events, hypoxemia was the most frequently observed complication in both groups, occurring in 57.14% of patients in the VL group and 41.27% in the DL group. Other observed complications included hypotension, aspiration, metabolic complications, cardiac arrest, failure to intubate, trauma, and arrhythmia. Overall, at least one adverse event occurred in 79.37% of patients in the VL group and 76.19% in the DL group. The difference was not statistically significant. The higher observed frequency of hypoxemia and metabolic complications in the VL group should therefore not be interpreted as evidence that VL is associated with greater procedural risk, particularly given the observational design and the potential influence of underlying illness severity and patient characteristics. In addition, adverse events were multiple-response outcomes, and individual patients could experience more than one complication.

Previous systematic reviews have reported variable effects of VL on complications. A systematic review and meta-analysis including 14 studies and 4,236 intubations reported a lower incidence of overall complications with VL compared with DL (20.4% vs. 23.1%; OR 0.62, 95% CI 0.40–0.97; p=0.03).[15] Other systematic reviews, including Cochrane evidence, have not demonstrated a consistent difference in hypoxemia between VL and DL.[5,9,15] Differences in patient acuity, intubation setting, operator experience, definitions of complications, and the type of VL device used may explain some of the heterogeneity between studies and the present findings.

The transition from the first reported orotracheal intubation by William Macewen in 1878 to modern video-assisted intubation has substantially advanced airway management.[17] Current evidence suggests that VL can improve glottic visualization and may improve first-pass success in selected clinical settings, particularly among patients with difficult airways or when direct visualization is challenging.[18] Nevertheless, the present findings emphasize that the choice of laryngoscopy device should not be considered independently of patient and airway characteristics.

For Nepal, the implication is therefore not simply to replace DL with VL, but to develop a dual-competency airway management system in which clinicians are appropriately trained in both techniques. VL may provide important advantages in selected patients and should be incorporated into airway training and clinical practice where resources permit, while DL should remain an essential rescue and backup skill. The introduction of VL should be accompanied by structured training, simulation-based education, competency assessment, and appropriate equipment availability. This approach can allow the benefits of newer technology to be incorporated without compromising clinicians ability to manage difficult or failed intubation when VL is unavailable or unsuccessful.

This study demonstrates a numerically higher first-pass success with VL than DL, but the difference was not statistically significant after adjustment for important airway and patient characteristics. The baseline imbalance in CL grade and the independent association between difficult laryngoscopic view and reduced first-pass success highlight the importance of considering for the airway difficulty when comparing laryngoscopy techniques. Larger, appropriately powered prospective studies with standardized VL devices, operator experience, and adjustment for airway difficulty are needed to determine the independent effect of VL on first-pass intubation success in emergency settings.

## CONCLUSION

Video laryngoscopy showed a numerically higher first-pass success rate than direct laryngoscopy, but this difference was not significant after adjustment for patient and airway characteristics. Difficult laryngoscopic view was independently associated with lower first-pass success, supporting the use of both techniques according to patient and airway characteristics.

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**Author's Contribution:** **Rony Maharjan :** Conceptualization, methodology, writing original draft, writing review and editing,



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supervising; **Kripa Maharjan**, **Shruti Silwal :** Data curation, investigation, writing review and editing; **Suraj Rijal:** Validation of resources, writing review and editing; **Kapil Raj Dhital, Dipesh Mangal Joshi :** Methodology, formal analysis, writing review.

**Conflict of interest:** Kripa Maharjan, a co-author of this manuscript, serves as Deputy Editor-in-Chief of the Journal of Nepal Medical Association (JNMA). To manage this potential conflict of interest, the manuscript was handled and the editorial decision was made by an independent editor. Dr Maharjan was excluded from all editorial and decision-making processes related to this manuscript.

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**Ethical Consideration:** Ethical issues (including plagiarism, data fabrication, and double publication) have been completely observed by the authors.

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## REFERENCES


1. Li T, Jafari D, Meyer C, Voroba A, Haddad G, Abecassis S, Bank M, Dym A, Naqvi A, Gujral R, Rolston D. Video laryngoscopy is associated with improved first-pass intubation success compared with direct laryngoscopy in emergency department trauma patients. Journal of the American College of Emergency Physicians Open. 2021 Feb;2(1):e12373. | DOI | Pubmed | Google Scholar | Full Text | Weblink |
2. Brown III CA, Kaji AH, Fantegrossi A, Carlson JN, April MD, Kilgo RW, Walls RM, National Emergency Airway Registry (NEAR) Investigators. Video laryngoscopy compared to augmented direct laryngoscopy in adult emergency department tracheal intubations: a National Emergency Airway Registry (NEAR) study. Academic Emergency Medicine. 2020 Feb;27(2):100-8. | DOI | Pubmed | GoogleScholar | FullText | Weblink |
3. Prekker ME, Driver BE, Trent SA for the DEVICE investigators and the Pragmatic Critical Care Research Group, et al. DirEct versus VIdeoLaryngosCopE (DEVICE): protocol and statistical analysis plan for a randomised clinical trial in critically ill adults undergoing emergency tracheal intubation BMJ Open 2023;13: e068978. | DOI | Pubmed | Google Scholar | Full Text | Weblink |
4. Sakles JC, Chiu S, Mosier J, Walker C, Stolz U. The importance of first pass success when performing orotracheal intubation in the emergency department. Academic Emergency Medicine. 2013 Jan;20(1):71-8.| DOI | PubMed | GoogleScholar | FullText | Weblink |
5. Hansel J, Rogers AM, Lewis SR, Cook TM, Smith AF. Videolaryngoscopy versus direct laryngoscopy for adults undergoing tracheal intubation. Cochrane Database of Systematic Reviews. 2022(4).| DOI | PubMed | GoogleScholar |FullText | Weblink |
6. Ahmed N, Hasan AK, Uddin MS, Bhuiyan MJ, Uddin MZ, Hasan KM, Kabir MA. Endotracheal intubation using video laryngoscopy causes less cardiovascular response and less airway morbidity compared to classic direct laryngoscopy during surgery. direct laryngoscopy during surgery. Bangladesh Critical Care Journal. 2022 Apr 25;10(1):52-6. | DOI | GoogleScholar | Weblink |
7. Lambert CT, John SC, John AV. Development and performance testing of the low-cost, 3D-printed, smartphone-compatible 'Tansen Videolaryngoscope'vs. Pentax-AWS videolaryngoscope vs. direct Macintosh laryngoscope: a manikin study. European Journal of Anaesthesiology| EJA. 2020 Nov 1;37(11):992-8. |DOI | PubMed | GoogleScholar |FullText | Weblink |
8. Hypes CD, Stolz U, Sakles JC, Joshi RR, Natt B, Malo J, Bloom JW, Mosier JM. Video laryngoscopy improves odds of first-attempt success at intubation in the intensive care unit: a propensity-matched analysis. Ann Am Thorac Soc. 2016 Mar;13(3):382–9. DOI
9. Polo PP, Ramirez-Rodriguez R, Alejandro-Salinas R, Yangali-Vicente J, Rivera-Lozada O, Barboza JJ. Video versus direct laryngoscopy for tracheal intubation of critically ill adults: a systematic review and meta-analysis. Journal of Clinical Medicine. 2025 Mar 13;14(6):1933. | DOI | PubMed | GoogleScholar | FullText | Weblink |
10. Sanguanwit P, Yuksen C, Laowattana N. Direct versus video laryngoscopy in emergency intubation: a randomized control trial study. Bulletin of Emergency & Trauma. 2021 Jul;9(3):118. | DOI | PubMed | GoogleScholar | FullText | Weblink |
11. Alsabri M, Abdelwahab OA, Elsnhory AB, Diab RA, Sabesan V, Ayyan M, McClean C, Alhadheri A. Video laryngoscopy versus direct laryngoscopy in achieving successful emergency endotracheal intubations: a systematic review and meta-analysis of randomized controlled trials. Systematic Reviews. 2024 Mar 12;13(1):85. | DOI | PubMed | GoogleScholar | Weblink |
12. Araújo B, Rivera A, Martins S, Abreu R, Cassa P, Silva M, Gallo de Moraes A. Video versus direct laryngoscopy in critically ill patients: an updated systematic review and meta-analysis of randomized controlled trials. Critical Care. 2024 Jan 2;28(1):1. | DOI | PubMed | GoogleScholar | Weblink |
13. Bhattacharjee S, Maitra S, Baidya DK. A comparison between video laryngoscopy and direct laryngoscopy for endotracheal intubation in the emergency department: a meta-analysis of randomized controlled trials. Journal of clinical anesthesia. 2018 Jun 1;47:21-6. | DOI | PubMed | GoogleScholar | Weblink |
14. Azam S, Khan ZZ, Shahbaz H, Siddiqui A, Masood N, Arif Y, Memon ZU, Khawar MH, Siddiqui FF, Azam F, Goyal A. Video versus direct laryngoscopy for intubation: updated systematic review and meta-analysis. Cureus. 2024 Jan 5;16(1). | PubMed | GoogleScholar | FullText | Weblink |
15. Arulkumaran N, Lowe J, Ions R, Mendoza M, Bennett V, Dunser MW. Videolaryngoscopy versus direct laryngoscopy for emergency orotracheal intubation outside the operating room: a systematic review and meta-analysis. British journal of anaesthesia. 2018 Apr 1;120(4):712-24. | DOI | PubMed | GoogleScholar | Weblink |
16. Jiang J, Ma D, Li B, Yue Y, Xue F. Video laryngoscopy does not improve the intubation outcomes in emergency and critical patients–a systematic review and meta-analysis of randomized controlled trials. Critical Care. 2017 Nov 24;21(1):288. | DOI | PubMed | GoogleScholar | Weblink |
17. Warinton E, Ahmed Z. Comparing the effectiveness and safety of videolaryngoscopy and direct laryngoscopy for endotracheal intubation in the paediatric emergency department: a systematic review and meta-analysis. Frontiers in Medicine. 2024 Sep 19;11:1373460. | DOI | Pubmed | GoogleScholar | FullText | Weblink |
18. Sugaya A, Naito K, Goto T, Hagiwara Y, Okamoto H, Watase H, Hasegawa K. First-pass success of video laryngoscope compared with direct laryngoscope in intubations performed by residents in the emergency department. Cureus. 2023 Oct 24;15(10).| DOI | Pubmed | GoogleScholar | FullText | Weblink |




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