

ORIGINAL ARTICLE

Post-COVID-19 intubation trends in emergency departments in Jeddah: a survey of emergency physicians' practices

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ABSTRACT

Background: The COVID-19 pandemic has significantly impacted medical practices worldwide, particularly in high-risk procedures such as endotracheal intubation. This study aimed to assess the changes in intubation practices among emergency physicians in Jeddah, Saudi Arabia, following the COVID-19 outbreak.

Methods: A cross-sectional study using an online questionnaire was conducted among emergency physicians in Jeddah. The questionnaire assessed intubation preferences, comfort levels, and skill maintenance practices post the COVID-19 pandemic.

Results: A total of 81 physicians completed the survey, representing a 51.5% response rate. The study revealed a substantial shift towards video laryngoscopy post-COVID-19. The percentage of physicians using video laryngoscope (VL) for more than 75% of intubations increased from 42% pre-pandemic to 65.2% post-pandemic. Concurrently, those using VL for less than 25% of cases decreased from 18.5% to 8.6%. While 69.1% of respondents reported high comfort levels with direct laryngoscopy (DL), 79% recognized the importance of maintaining DL skills. However, 57% admitted to not actively practicing DL. The availability of devices was the primary factor influencing VL use, followed by comfort level and first-pass success rate.

Conclusion: The COVID-19 pandemic has accelerated the trend towards VL use in emergency departments in Jeddah. While physicians acknowledge the importance of maintaining DL skills, there is a notable lack of active practice. These findings highlight the need for targeted training programs to maintain proficiency in both VL and DL techniques, ensuring optimal patient care in various clinical scenarios.

Keywords: COVID-19, direct laryngoscope, video laryngoscope.

Introduction

The coronavirus disease (COVID-19) pandemic has profoundly impacted emergency medical practices, particularly airway management. Emergency tracheal intubation in COVID-19 patients poses a significant risk to patients and healthcare providers, necessitating rapid adaptation in clinical practice [1,2].

The pandemic led to substantial changes in airway management techniques globally. Previous studies have shown an increased use of personal protective equipment and rapid sequence induction during intubations of COVID-19 patients [1]. Another study observed an increased use of video laryngoscope (VL)

and neuromuscular blocking agents during the pandemic [3]. These changes were primarily driven by the need to minimize viral exposure risk to healthcare workers while maintaining high-quality patient care.

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In the context of Saudi Arabia, the Saudi Board Emergency Medicine Curriculum emphasizes the importance of mastering various airway management techniques [4]. However, the pandemic necessitated a rapid adjustment to these established practices. The shift in intubation strategies observed globally raised questions about how these changes manifested in the specific context of Jeddah's emergency departments.

Our study aimed to provide insights into emergency airway management in the region and inform future training and practice guidelines.

Subjects and Methods

Study settings

An online questionnaire was sent to emergency physicians working in various hospitals in the city of Jeddah, Saudi Arabia. All adult emergency physicians working at all public hospitals in Jeddah were included in the study. The head of the department in each hospital was contacted to verify the number of physicians working in their department. The questionnaire was sent in December 2024 using the Microsoft Forms website. Three reminders were sent at 2-week intervals.

Table 1. Selected characteristics of study participants.

Characteristic	Category	n (%) Total = 81
Age (years)	20-30	4 (4.9%)
	31-40	46 (56.8%)
	41-50	22 (27.2%)
	51-60	9 (11.1%)
Gender	Male	63 (77.8%)
	Female	18 (22.2%)
Practice level	Consultant	45 (55.6%)
	Specialist (registrar)	36 (44.4%)
Type of practice institution *	Trauma center	23
	Academic setting	53
Average patients per shift	<8	1 (1.2%)
	8–12	5 (6.2%)
	12-16	5 (6.2%)
	>16	70 (86.4%)
No. of intubations performed last month	<5	48 (59.3%)
	5-10	25 (30.9%)
	11-15	6 (7.4%)
	>15	2 (2.5%)
Years of ED practice	No board certificate in EM	2 (2.5%)
	<5	26 (32.1%)
	5–10	25 (30.0 %)
	>10	28 (34.6 %)

*Multiple choices permitted; ED: emergency department; EM: emergency medicine.

Table 2. Intubation practices among study participants.

Variable		n (%), Total = 81
Comfort level using DL	Very comfortable	56 (69.1%)
	Somewhat comfortable	20 (24.1%)
	Neither comfortable nor uncomfortable	3 (3.7%)
	Somewhat uncomfortable	2 (2.5%)
	Very uncomfortable	0
Frequency of using VL prior to COVID-19 pandemic	>75% of intubations	34 (42%)
	50%-75% of intubations	20 (24.7%)
	25%-50% of intubations	12 (14.8%)
	<25% of intubations	15 (18.5%)
Frequency of using VL after COVID-19 pandemic	>75% of intubations	53 (65.2%)
	50%-75% of intubations	16 (19.2%)
	25%-50% of intubations	5 (6.2%)
	<25% of intubations	7 (8.6%)
Factors affecting level of comfort using VL*	Availability of devices	60
	Comfort level	44
	Success rate of first pass intubation	41
	Hospital protocol	20
Indications for using VL	Almost all cases	57 (70.4%)
	Cases of difficult intubations as first option	13 (16%)
	Cases of difficult intubation as a second option	6 (7.4%)
	Not used on routine bases	5 (6.2%)
Using Bougie as an adjunct to intubation	With first attempt at intubation	10 (12.3%)
	With second or subsequent attempts at intubation	65 (80.2%)
	Never used at intubation	6 (7.4%)
Importance of preserving DL skills	Extremely important	64 (79%)
	Somewhat important	11 (13.6%)
	Neutral	6 (7.4%)
	Somewhat unimportant	0
	Extremely unimportant	0
Methods used to preserve DL skills*	Practice in simulation	17
	Attending workshops	14
	I do not practice	57
	I feel I do an adequate number of intubations	13
Estimate of first success rate using DL	>50% of cases	68 (84%)
	25%-50% of cases	7 (8.6%)
	<25% of cases	1 (1.2%)
	I do not use DL routinely	5 (6.1%)
Preferred device for VL	CMAC	19
	Glidoscope	62
	King vision	81

* Multiple answers allowed; DL: direct laryngoscope; VL: video laryngoscope; COVID-19: coronavirus disease.

Participants were recruited from hospitals with accredited emergency medicine residency programs and/or trauma centers. The questionnaire included questions about the frequency of VL use, comfort levels with direct laryngoscope (DL), and estimated first-pass success rates.

Questionnaire design

The questionnaire was adapted, with modifications based on a study published by Saracoglu et al. [5]. Two independent emergency physicians (JN and MS) assessed the questionnaire. Ethical approval was obtained from the University of Jeddah Bioethics Committee of the Scientific and Medical Research Committee (application number UJ-REC-295).

Data analysis

Data were analyzed using descriptive statistics. Subgroup univariate analysis was done using chi-square or Fisher's exact tests, as appropriate. Statistical Package for the Social Sciences version 29 was used for analysis. A p -value < 0.05 was considered significant.

Results

The survey was sent to 157 emergency physicians, and 81 (51.5%) completed it. 63 (77%) of the respondents were male.

Table 1 summarizes the respondents' demographics. Most of the respondents [28/81 (65%)] had more than 5 years of experience after obtaining board certification. The majority of respondents [45/81 (55.6%)] were consultants. Most respondents [70/81 (86.4%)] reported having more than 16 patients registering per shift. When asked about the average number of intubations per month, 48/81 (59.3%) reported intubating less than 5 times per month.

Table 2 summarizes the intubation practices, with 56/81 (69.1%) feeling "very comfortable" using DL for intubation. The study showed an increased use of VL as the first option for intubation, from 42% to 65.2%. Most of the respondents [57/81 (70.4%)] used VL for almost all intubations regardless of the difficulty of the airway. Concerning physicians' perceptions, 56/81 (69.1%) physicians reported feeling "very comfortable" using DL, with 68/81 (84%) estimating successful intubation in more than 50% of the cases using DL. 64/81 (79%) physicians considered preserving DL skills as "extremely important." Figure 1 illustrates the change in frequency of VL use in the ED before and after the COVID-19 pandemic.

Table 3 summarizes the subgroup analysis of the factors affecting the reported level of comfort using DL. Years of experience of more than 5 years showed a trend towards statistical significance (75% vs. 57.7%, $p = 0.1$).

Table 3. Univariate analysis on the level of comfort using direct laryngoscope.

Variable	Comfortable using direct laryngoscope	p-value
Age		
<40	33/50 (66%)	0.438
>40	23/31 (25.8%)	
Gender		
Male	46/63 (73%)	0.157
Female	10/18 (55.6%)	
Years of EM experience after obtaining board certification		
<5 years	15/26 (57.7%)	0.106
>5 years	40/53 (75.5%)	
Practice level		
Consultant	36/45 (80%)	0.018
Specialist (registrar)	20/36 (55.6%)	
Intubations per month		
<5 intubations	31/48 (64.45%)	0.285
>5 intubations	25/33 (75.5%)	

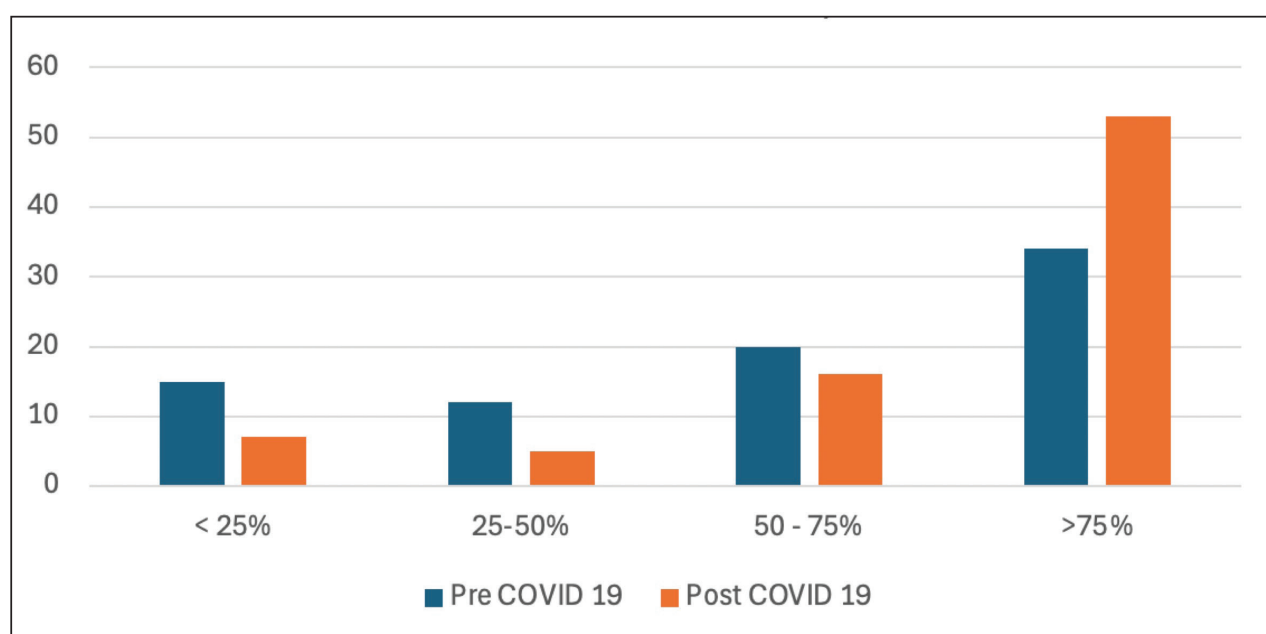


Figure 1. Frequency of using VL in intubations (VL use as number of intubations).

Consultants felt more comfortable using DL compared with specialists (80% vs. 55.6%, $p = 0.017$).

Discussion

Our study highlighted the significant changes in intubation practices reported by emergency physicians in Jeddah following the COVID-19 pandemic. The increased use of VL and improved reported first-pass success rates are encouraging advancements, reflecting a global trend towards safer and more effective airway management. The Video versus Direct Laryngoscopy for Tracheal Intubation of Critically Ill Adults trial presented compelling evidence supporting the utilization of VL as a primary intervention for intubation [6].

However, the increased reliance on VL also raises concerns about the potential erosion of DL skills, particularly among newer generations of emergency physicians, who may have limited exposure to DL during their training. Resnick-Ault et al. [7] emphasized the importance of maintaining proficiency in both the VL and DL techniques. This is crucial for scenarios where VL may not be available or appropriate. For instance, when multiple patients need intubation simultaneously in centers that have one VL device [7].

The increased use of VL and the improvement in reported first-pass success rates observed in our study are likely to translate into better patient outcomes. First-pass success is crucial in emergency airway management as multiple attempts can increase the risk of complications such as hypoxia, aspiration, and trauma to the airway [8]. The global trend towards safer and more effective airway management practices, as reflected in our findings [6], suggests that patients benefit from these advancements. Future research should focus on quantifying these benefits by comparing patient outcomes before and after the widespread adoption of VL. Objective measures, such as complication rates, duration of intubation, and patient recovery times, would provide valuable insights into the effectiveness of these practices.

The importance of comprehensive airway management training was further highlighted by the high value placed on preserving DL skills by the surveyed physicians. This aligns with the recommendations of educational guidelines that emphasize the need for emergency medicine residents to be proficient in multiple airway management techniques [9].

The COVID-19 pandemic has accelerated changes in medical education and training, with greater emphasis on simulation-based training and virtual learning platforms [10]. These modalities can be leveraged to ensure that emergency physicians maintain and improve their skills in both VL and DL, even in environments where DL is less frequently used.

Our study's limitations include its reliance on self-reported data and the potential for recall bias. Future research should include objective measures of intubation performance and patient outcomes. Additionally, a prospective study design could provide more accurate data on the complication rates and their causes.

Conclusion

While the pandemic has driven positive changes in intubation practices, it has also highlighted the need for ongoing investments in comprehensive airway management training. This includes maintaining proficiency in both VL and DL techniques and ensuring that emergency physicians are well-versed in managing the complications associated with intubation. By integrating these elements into medical education and training programs, we can ensure that future generations of emergency physicians will be equipped to provide safe and effective airway management in any clinical context.

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List of Abbreviations

COVID-19	Coronavirus disease 2019
DL	Direct laryngoscope
ED	Emergency department
EM	Emergency medicine
VL	Video laryngoscope

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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Consent to participate

Consent was implied if the participants filled out the survey.

Ethical approval

Ethics approval was obtained from the University of Jeddah Bioethics Committee of Scientific and Medical Research Committee (Application number UJ-REC-295) on 1/12/2024.

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References

1. Ismath M, Black H, Hrymak C, Rosychuk RJ, Archambault P, Fok PT, et al. Characterizing intubation practices in response to the COVID-19 pandemic: a survey of the Canadian COVID-19 Emergency Department Rapid Response Network (CCEDRRN) sites. *BMC Emergency Med.* 2023;23(1):139. <https://doi.org/10.1186/s12873-023-00883-6>

2. Alhabboubi M, De Champlain F, Alqaydi K, Algamdi B, Nemeth J, Clark G. Trauma Care During the COVID-19 Pandemic: a Canadian Survey. *Clin Investigative Med*. 2021;44(4):E17–22. <https://doi.org/10.25011/cim.v44i4.37143>
3. Mohr NM, Santos Leon E, Carlson JN, Driver B, Krishnadasan A, Harland KK, et al. Endotracheal Intubation Strategy, Success, and Adverse Events Among Emergency Department Patients During the COVID-19 Pandemic. *Ann Emergency Med*. 2023;81(2):145–57. <https://doi.org/10.1016/j.annemergmed.2022.06.021>
4. Saudi Board Emergency Medicine Curriculum 2014. <https://scfhs.org.sa/sites/default/files/2022-01/Emergency%20Medicine.pdf> . Accessed 01 May 2025.
5. Saracoglu A, Saracoglu KT, Sorbello M, Çakmak G, Greif R. The influence of the COVID-19 pandemic on videolaryngoscopy: a cross-sectional before-and-after survey. *Anaesthesiology Intensive Therapy*. 2023;55(2):93–102. <https://doi.org/10.5114/ait.2023.125442>
6. Prekker ME, Driver BE, Trent SA, Resnick-Ault D, Seitz KP, Russell DW, et al. Video versus Direct Laryngoscopy for Tracheal Intubation of Critically Ill Adults. *New England J Med*. 2023;389(5):418–29. <https://doi.org/10.1056/NEJMoa2303721>
7. Resnick-Ault D, Gandotra S, Gaillard JP. POINT: direct Laryngoscopy: The Building Block to Airway Expertise? Yes. *Chest*. 2024;165(6):1296–7. <https://doi.org/10.1016/j.chest.2024.02.032>
8. 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 Med*. 2013;20(1):71–8. <https://doi.org/10.1111/acem.12055>
9. Kei J, Jang N, Silver M. National Survey of Airway Management Practices and Training Among Emergency Medicine Residency Programs in the United States. *Permanente J*. 2025;29(1):50–60. <https://doi.org/10.7812/TPP/24.013>
10. Stark N, Hayirli T, Bhanja A, Kerrissey M, Hardy J, Peabody CR. Unprecedented Training: experience of Residents During the COVID-19 Pandemic. *Ann Emergency Med*. 2022;79(5):488–94. <https://doi.org/10.1016/j.annemergmed.2021.10.010>