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COMMENT

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Airway management education and retraining: an unresolved paradigm

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Abstract

Simulation is a cornerstone of medical education for difficult airway management. The lack of standards regarding the frequency of retraining that would ensure the maintenance of skills and competencies over time still needs to be solved.

Keywords Airway management, Medical education, Anesthesiology, Difficult airways, Learning curve

Manuscript

Dear editor

We have carefully read the work of Bielka et al. (https://doi.org/10.1186/s12871-024-02423-x) on anesthesiologists' management of "*cannot intubate, cannot ventilate*" (CICV) scenarios and adherence to the 2015 DAS guidelines for difficult airway management. According to this article, simulation retraining significantly improved anesthesiologists' performance immediately after training and six months later, reducing the time to call for help and time to initiate a surgical airway. However there was a decline in their skill after six months [1].

Recently, there has been growing concern regarding anesthesiologists' ability to manage the airway properly [1, 2]. It is important to recognize that there are limitations in airway management and know how to address the problem from an educational approach. *Bielka et al.'s* work is noteworthy as a study that forcefully addresses the issue of airway retraining. The ability to learn, remember, and process declarative knowledge in emergencies is related to the interrelationship of such knowledge and available options; techniques taught independently create confusion and cognitive overload [2, 3].

Medical education in anesthesia is particularly challenging, especially regarding airway management. Recent research by *Howard et al.* found that less than half of active anesthesiologists practiced eFONA during their training, and only 7% felt confident in their ability to perform cricothyroidotomy [4].

Simulation training has been shown to improve compliance with established recommendations and algorithms and prevent the loss of knowledge and advanced skills over time [5]. In addition, advising and self-assessment, along with positive reinforcement of practitioners in clinical settings, can lead to better performance outcomes and the development of competencies that foster structured thinking, critical analysis of situations, effective communication with colleagues, teamwork, patient safety, and understanding of limitations in high-risk contexts [5, 6].

In recent years, several authors have described the impact of the human factor on airway management. A

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Table 1 Retraining recommendations for inexperienced and expert personnel

	Inexperienced*	Expert**
Nonsurgical manual skills ***Hand-eye* skills**	– Airway clearance maneuvers – Ventilation maneuvers – Rescue techniques. – Direct laryngoscopy – Video laryngoscopy	– Simulation for compliance with difficult airway management algorithms. – Fiberoptic bronchoscopy
Surgical skills	No recommendation	– Cricothyroidotomy – Retrograde intubation

*Inexperienced: Non-anesthesiologists. **Expert: Anesthesiologists

major problem is the reluctance to learn or the adherence to intrinsic beliefs among staff with several years of experience; this problem could be solved by implementing a structured training plan and making periodic and targeted training mandatory (2, 7–8).

We consider that the periodicity of retraining should be based on the type of technical skills to be strengthened (depending upon the personnel to be retrained) and on empowerment skills for effective leadership and assertive decision-making (6–7). From a technical point of view, a learning curve requires a minimum number of procedures to be performed, another number for its improvement —corresponding to the expected error rate of a trainee [7]— and finally, the maintenance of the acquired skill, which is *time-dependent*.

We classified the skills into two categories: nonsurgical manual skills (airway clearance maneuvers, ventilation, rescue techniques, and direct laryngoscopy) and surgical skills.

Loss of performance in hand-eye coordination and surgical skills has been shown to occur within three months of not performing the procedure [8]. For example, the current recommendation for fiberoptic bronchoscopy is to perform at least one monthly procedure to maintain proficiency [9]. On the other hand, surgical skills require further study and practice (review of anatomy, technique, visualization of the procedure, and practice on animal models) [9]. Currently, no studies establish a minimum number of procedures required to maintain surgical skill proficiency.

Medical education in airway management is challenging, and the lack of standards related to the need for simulation-based retraining to ensure skills maintenance over time still needs to be solved. *Bielka et al.*. and *Kuduvalli et al.* have shown that skills acquired in airway management tend to fade away with time [1, 10]. Therefore, experimental studies with larger sample sizes and longer outcomes should be conducted to ascertain the appropriate time for retraining both inexperienced and expert practitioners in airway management (Table 1).

It is essential to emphasize the human factors involved in the process, which are limited by the professional's ability to respond to stress, the regularity of training, and the availability of equipment that enables proper planning and adaptation of different recommendations. During the simulation exercise, it is important to promote teamwork and assign roles based on each participant's level of experience and limitations with the equipment or techniques being used. A checklist and a structured plan for handling failure should be adopted to anticipate possible complications and outcomes associated with the procedure [9].

Understanding specific physician training needs, human factors, and performance in emergency airway management is an area of interest in medical research that is still under development. Simulation has clear and convincing evidence in the teaching-learning process; however, the periodicity of retraining that allows efficient retention of acquired skills, especially for practicing physicians with years of experience, has yet to be elucidated [1, 9, 11]. A fundamental part of the training process should be the view of trainees as comprehensive beings, as well as the control of emotions and adaptation to stress.

More studies are warranted to assess the duration of skill retention. Experimental studies can be conducted to elucidate this aspect.

Abbreviations

DAS	Difficult Airway Society
eFONA	Emergency Front-Of-Neck Access
CICV	Cannot Intubate, Cannot Ventilate

Author contributions

VG-P: Conception and planning of the study, data acquisition, drafting of the manuscript. JHTP: Planning, implementation of the study, drafting of the manuscript and critical revision for important intellectual content. JARC: Critical revision of the draft for important intellectual content, and final approval of the version to be published.

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Data availability

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