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## Editorial

# Airway Management Education: Are we teaching what we think we are teaching?

*A little learning is a dangerous thing;  
Drink deep, or taste not the Pierian spring:  
There shallow draughts intoxicate the brain,  
and drinking largely sobers us again.*

Alexander Pope, *An Essay on Criticism*, 1709

In this edition of the journal, Satyapal and colleagues describe a study in which video recordings of intubation attempts by novice practitioners – and the concurrent clinical supervision by their seniors – was systematically analysed to discern errors in technique, factors influencing success or failure, and how supervisors intervened to transfer skills.<sup>1</sup> This novel approach to assessing airway teaching within the confines of a controlled South African teaching hospital environment casts light on the important issues of what, when, where and how we are teaching airway management. Moreover, it gives us cause to reflect on the fundamental questions: Why are we teaching airway skills? What are our goals? Which ethical principles have precedence? Who should be learning to manage airways, and critically: Who should be learning to teach?

As the authors clearly state, airway management (and particularly tracheal intubation) is a core competency for junior doctors dispatched to remote areas across the country, and the underserved wilderness of many inner-city hospitals. While this is a crucial facet of resuscitation and emergency care, it is within the setting of training rotations in anaesthesiology that most students and junior doctors are expected to attain adequate skills and experience. However, it is frequently outside this controlled environment that they are later required to function with limited supervision. We must be certain, therefore, that we are providing robust and consistent training.

In the study by Satyapal et al., all participants had undergone some form of prior supervised training on a manikin, simulator, or in the clinical setting, with the majority expressing confidence in their capability to intubate (albeit with willingness to undergo further instruction). Despite this, errors of technique and intubation failures were commonplace. As so eloquently stated by Pope and later elucidated by the seminal work of Dunning and Kruger,<sup>2</sup> “a little learning is a dangerous thing”<sup>3</sup> Routine airway management in patients without clear predictors of difficulty is usually easy, building false confidence and allowing novices to “work around” poor technique. Our common focus on outcome, rather than process, compounds the problem. Indeed, as the authors aptly state while describing a relative novice becoming the supervisor and passing on entrenched errors, “perseveration of error becomes normalisation of deviancy.” How then do we guide our trainees to “drink largely” of the fountain of airway knowledge?

Medical educators in airway management have run the full gamut of teaching modalities: didactic, interactive, self-directed, online/e-learning, part-task trainers, deliberate practice, supervised clinical application and immersive simulation. In South Africa, the majority of training has been a combination of lectures, skills laboratory training, and supervised clinical experience, but online resources, short courses, development of specialist Fellow training, and increasing use of simulation is ascendent.<sup>4</sup> Typically, this growth has been desirable but

uncoordinated, as evidenced by the plethora of popular but similar airway courses available across the country. We must ask critically: What are we trying to achieve?

Improving patient outcomes is the ultimate goal of airway education. In the process, we may enhance practitioner skills and confidence. This requires recognising the scope and level of skills which are required to be proficient and safe. While core skills such as airway assessment, mask ventilation, drug administration and intubation are essential, we must recognise that training novices for the inevitability of unexpected difficulty and intubation failure is equally important.<sup>5</sup> Great emphasis is placed on intubation, but very few novices in South Africa have the opportunity to proceed through drills of failed intubation and oxygenation, placement of rescue supraglottic airways, or front-of-neck access (FONA). Should we be flipping our training, and teaching FONA as readily as face-mask use, or will this precipitate a deluge of reflexive cricothyroid cuts? Consider: If your trainee failed a possibly achievable intubation, but avoided permanent sequelae through skilful surgical airway, would you admonish or admire? Pope suggests: “For fools rush in where angels fear to tread,” but later reminds us that “Good nature and good sense must ever join; To err is human, to forgive divine.”

Clearly, a national curriculum for airway management education would be stratified to accommodate junior doctors and front-end workers such as prehospital, emergency medicine, anaesthesia, surgical and medical acute-care doctors, and critical care practitioners, and would include a pedagogical model designed to first strengthen the novice.<sup>5</sup> Growing evidence points to the use of deliberate practice as a method of instruction in this group.<sup>6-8</sup> As stated by Satyapal et al., constraints on the system prevent adequate clinical exposure to develop the totally naive in the clinical setting alone. Basic standards of skill acquisition must be established before transition into clinical practice, and mastery standards coupled to the agreed learning outcomes must fit into courses ratified by a national curriculum.

Although anaesthesiologists take pride in considering themselves masters of all arcane airway arts, we must recognise that the skills are no less essential to practitioners from a wide variety of fields.<sup>5</sup> The most important person to have airway management skills in a crisis is the one at the patient’s bedside. Indeed, we should also acknowledge the significant contributions from disciplines such as Emergency Medicine in airway research. We must therefore break down the silos between fields, build consensus on best practice, and share our mutual strengths rather than focussing on territorial differences. A national curriculum would also reinforce the important messages across specialities, agreeing on learning outcomes and core competencies.

Satyapal et al. raise an interesting issue of the ethical boundaries during clinical instruction. They note the high incidence of failure during intubation under suboptimal conditions (such as absence of neuromuscular blockade or inadequate positioning) by novices in their cohort, and suggest that it may be an error of judgement on the part of the instructor. Relative neophytes performing blind nasal intubations may be judged in the same light, although it is interesting to note that these procedures were all successful in the study. The benefit and

distributive justice of future patient safety in the hands of the educated practitioner must be balanced against the individual risk and autonomy of the patient upon whom learning occurs. Training the trainers to observe and intervene, and the trainee to obtain process proficiency before clinical exposure, sways this balance in favour of the patients.

The role of simulation in airway management education remains controversial. To some, simulation simply means using a plastic manikin to practice a manual skill, where others would presume it to imply an immersive, team-based clinical scenario. The increasing use of simulation training requires us to examine where it makes a meaningful difference. As the authors state, there has not yet been conclusive evidence of improvement in airway outcomes with this modality. However, extrapolation from other fields, such as central venous access and central line associated bloodstream infections, indicates that simulation-based mastery learning combined with deliberate practice may provide the ideal mechanism for integrating existing skills and knowledge into active decision-making, and the growth of practitioner non-technical skills.<sup>7-14</sup> As stated by Gaba in 1992, "no industry in which human lives depend on the skilled performance of responsible operators has waited for unequivocal proof of the benefits of simulation before embracing it... Neither should anaesthesiology."<sup>15</sup> However, it remains challenging to separate the value of the motivated teaching implicit in simulation, and the accompanying inspired improvement in practitioner non-technical skills from the benefits of the simulation modality itself.

As a foundation for creating a unified approach to airway management education, aimed at ensuring patient safety, several fundamental concepts emerge:

1. For expert skill acquisition, it is necessary to have clearly articulated goals or mastery standards, and methods of objective measurement and feedback that these goals have been attained.<sup>6</sup> Ideally, these should cross geographical and speciality borders.
2. Focusing on the endpoint ('tube in trachea') without addressing ideal technique, likely pitfalls, and strategies for failure is priming novices for disaster when they encounter unexpected difficulty.
3. Training tools must be true to task. Use of plastic manikins to train manual dexterity skills that rely heavily on tactile feedback from the tissues will always be limited by the quality of the materials. However, with the correct direction, these 'unreal' models could be used to train and achieve part-tasks such as positioning, equipment checks, and procedural steps. Trainers should strive for 'functional task alignment': aligning the educational experience with the critical steps required to be task proficient.<sup>16</sup>
4. Failing to train for failure is a failure of training. If we agree that teaching novices what to do when they fail is necessary – and that failure is always possible – then simulation is an unparalleled modality for training assessment, decision making, teamwork, non-technical or human factor skills and stress inoculation.
5. Advancing airway education in isolation limits progress. National multidisciplinary collaboration on an airway curriculum is essential, and overdue.

Satyapal and colleagues are to be commended for their detailed examination of a microcosm of airway training within their institution. Like most fruitful research, it has yielded some simple truths and unearthed many more complex questions. As airway educators, it behoves us to examine our goals, and ask the question: What are we trying to achieve?

The final words of Pope's essay are perhaps instructive to all who would learn to teach, and teach to learn:

*"If hence the unlearned their wants may view,  
The learned reflect on what before they knew.  
Careless of censure, nor too fond of fame,  
Still pleased to praise, yet not afraid to blame;  
Averse alike to flatter or offend,  
Not free from faults, nor yet too vain to mend."*<sup>3</sup>

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