

Emergency Airway Management

Competence versus Expertise?

TRACHEAL intubation is commonly performed, is usually relatively easy, and may be lifesaving; it may occasionally be life threatening. The risks of intubation reflect a balance of factors relating to the operator (skill, experience, presence) and to the patient (anatomy, comorbidity, pathophysiology). Having typically achieved proficiency in the operating room, anesthesia trainees frequently provide airway management elsewhere in the hospital.

Emergency airway care outside the operating room carries extra hazards owing to a higher incidence of risk factors (often in combination), fewer options, and limited backup. Such care is delivered by a wide variety of healthcare professionals working in diverse conditions, inside and outside hospitals. Indeed, one might suppose that care for those who are most critically ill provided by those who are not—yet—the most expert represents an example of what has been called the “inverse care law.”¹ In this sense, there is an information gap on standards of practice: Is it appropriate for unsupervised trainees to deliver emergency airway care?

Together with other data,²⁻⁵ the observational study by Schmidt *et al.*⁶ is a step toward filling this gap. Emergency airway care was provided by anesthesia trainees with the assistance of respiratory therapists who were always present, and attending anesthesiologists who were sometimes present. The key finding was that the presence of the attending was associated with a lower incidence of complications. For the reader, there are key questions. First, is the result “real,” *i.e.*, is there something about the study design that leaves the findings open to reasonable doubt? Second, if true, what is the explanation?

The complications were a “composite” sum of events (*e.g.*, aspiration, endobronchial intubation, dental trauma). Even if the composite measure included all of the important elements (it doesn't), its use is problematic. The elements of the composite are individually distinct in terms of mechanisms and consequences: Because they are incommensurate, they cannot be “added” to yield a simple score. The composite accords equal

weight to serious and not-so-serious complications. Also, their incidences do not necessarily parallel each other, and reducing one complication (*e.g.*, avoiding dental trauma) could conceivably increase another (*e.g.*, risk of aspiration). Another problem with composite outcomes is that while they convey an overall signal, they are used because the individual elements are not significantly different between the groups. That is, studies that rely on composite outcomes are inherently underpowered, and the reader must be concerned that the effect is more apparent than real.

The presence of the attending physicians also attracts attention: Why were they sometimes present and sometimes not? The authors use statistical approaches to show that for all the recordable influences, there was no difference between those patients for whom the attending physicians were present *versus* those for whom they were not. Although some statistical techniques can readily “prove” that such groups are “different,” none can “prove” that they are identical, and—because they were not randomized—it is highly unlikely that they were. However, even if the patients who received attending-supervised care were sicker, this should predict more complications, not less. There must have been something different about the care received, over and above the risk profile of the patients.

The clue here may be neuromuscular blockers: They were more commonly used when an attending was present. This may represent a standardized or protocolized approach (implicit or explicit) to airway management, with trainees using these agents less in unsupervised emergencies. The finding that their use was not associated with more complications is not surprising because they were used in the presence of the more experienced attending physicians. Experience and judgment are not easily measured, but most of us have no problem recognizing them. It is this experience that we believe might have been the key influence on the observed outcome.

Where does a study such as this fit in the context of other work? Actually, the data are surprisingly scant. A previous report from the same institution also found that emergency intubation was associated with a high incidence of (composite) complications and a high mortality,² adding consistency—and credibility—to the current report.⁶ Of note, in the earlier study² mortality was not greater in those with complications *versus* those without, suggesting that the complications were not life threatening, or that the composite approach to complications has limited validity (or both). A multicenter observational study also demonstrated substantial intuba-

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tion-related morbidity (again, composite) after airway management by trainees, suggesting that senior help was the only factor that reduced complications.³

We have focused on whether care that is delivered (or supervised) directly by attending physicians is better than that delivered by residents acting independently. The question might better be put: Would you want *your* care to be supervised? Clearly, if the procedure is simple, the trainee is excellent, and the consequences are negligible, it would hardly seem to matter. But sometimes these circumstances do not hold, and it may matter.

In terms of what “matters,” patient safety comes in a clear first. But this really is the tip of the iceberg, and underlying it are other priorities, including patient satisfaction, resident education, economics, logistics, scheduling, emergency planning, resource management, and—if on-call responsibilities were to be increased—impact on the attending physicians who would provide greater on-call commitment. If all of these are inserted into the equation of training doctors and treating patients, it becomes a very complicated equation indeed. It is unlikely that any particular combination of physicians, educators, and administrators will get it right for all circumstances. In a perfect world, all of these concerns would be orientated in the same trajectory, but it’s an imperfect world, and they’re not.

Patient satisfaction is a composite of avoiding mishaps and enhancing the positive elements of care. Absence of “negatives” (e.g., nausea, dental trauma, laryngeal injury) and presence of positives (e.g., outstanding analgesia, an impression that they “matter,” a sense that their physician is available and cares) coupled with a perception that the system is working for them are some of the elements that comprise satisfaction (which is not restricted to avoidance of morbidity⁷). This complicated matrix that constitutes patient satisfaction goes far beyond whether there is attending supervision: There is a whole team and an institutional ethos in action, and all members must play their part. Nonetheless, patients will be more satisfied if their care is supervised by an engaged attending, and less satisfied by an attending they never meet (or meet only during disclosure of a complication).

What about the residents in all of this? Residents are, after all, in the business of caring for patients and learning their profession, and so some balance of teaching, learning, and progressive independence is required. It is at “independence” that the current article—perhaps unwittingly—takes aim⁶; the conclusion is that despite apparently ample training and experience, the addition of a supervising attending serves the patient better. This raises two questions: Were the trainees correctly assessed for competence (and do we know how to do this)? And, although the patients seemed to benefit from the attending input (we do not know this for certain),

did the supervision help make the residents into better doctors?

Managing the transition from “basic” learner to accomplished “expert” in an interventional specialty can be a bumpy road; it may not matter so much in generalist areas where interventions are minor and where “competence” rather than “expertise” is valued. Acquired experience and knowledge in interventional medicine has several dimensions. There are “positive” inputs, consisting of knowledge of what to do and the skills and techniques of how to do it, and such positive knowledge and skill is reinforced when a patient does well. Of course, there are also the “negative” dimensions, consisting of knowledge of what to avoid and how not to do it, and sometimes these negative lessons are bitterly (and usually indelibly) learned when a patient does not do well. In these situations, we always reflect on the adequacy of supervision and the degree of experience.

It is hard to imagine any clinician who does not take pride in quality. A proposed marker of quality of care is “failure to rescue” (i.e., death after an in-hospital complication), and this, as well as risk-adjusted 30-day mortality rates, is lower where patients were cared for by anesthesiologists with (*vs.* without) board certification.⁴ If prognosis truly is worsened by the first postoperative complication,⁵ the quality of the response at the time of that complication represents the patient’s best hope. Most specialties seem to have a consensus that trained specialists, on balance, produce the best outcomes. But not everyone believes this, and some play down the utility of greater expertise and knowledge. Indeed, a recent article suggested that intensivist-provided care might be associated with *worsened* risk-adjusted intensive care unit outcome,⁸ stating that this might be because “critical care physicians *may use their own judgment to manage patients instead of using standardized protocols* [our italics],” an unsupported and, in the context of a profession, most remarkable assertion.

Schmidt *et al.*⁶ suggest that a randomized trial might resolve the issue, but let’s face it: Who would consent to being randomized to emergency lifesaving care that was to be either directly supervised by an expert or was not? Not many.

How much more data—beyond logic and experience—would it take to make a persuasive case for the presence of senior anesthesiologists for emergency airway care? We do not believe that the issue can be resolved with a specific or singular test; rather, it will evolve—as it has done for generations of anesthesia residents and attending physicians—based on experience, debate, review, case series, and intuition, as well as on publications such as the one by Schmidt *et al.*⁶ In many ways, this dependence on imperfect data is analogous to legislating against cell phone use while driving, an issue resolved insofar as such questions can be.⁹ At a time when protocols are being touted as a key aspect of

medical decision making—with little or no supporting data—any study that examines the role of hands-on expertise is one to be looked at with interest, and the questions are to be taken seriously. This is another example of an important issue that can certainly be addressed but not easily resolved.

In conclusion, procedural competence, as achieved during residency, is different from expertise that is achieved beyond residency. Although some may target the provision of competence as a benchmark, the article by Schmidt *et al.*⁶ suggests that during emergency airway management, the presence of expertise makes a difference.

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References

1. Hart JT: The inverse care law. *Lancet* 1971; 1:405-12
2. Benedetto WJ, Hess DR, Gettings E, Bigatello LM, Toon H, Hurford WE, Schmidt U: Urgent tracheal intubation in general hospital units: An observational study. *J Clin Anesth* 2007; 19:20-4
3. Jaber S, Amraoui J, Lefrant JY, Arich C, Cohendy R, Landreau L, Calvet Y, Capdevila X, Mahamat A, Eledjam JJ: Clinical practice and risk factors for immediate complications of endotracheal intubation in the intensive care unit: A prospective, multiple-center study. *Crit Care Med* 2006; 34:2355-61
4. Silber JH, Kennedy SK, Even-Shoshan O, Chen W, Mosher RE, Showan AM, Longnecker DE: Anesthesiologist board certification and patient outcomes. *ANESTHESIOLOGY* 2002; 96:1044-52
5. Silber JH, Rosenbaum PR, Trudeau ME, Chen W, Zhang X, Kelz RR, Mosher RE, Even-Shoshan O: Changes in prognosis after the first postoperative complication. *Med Care* 2005; 43:122-31
6. Schmidt UH, Kumwilaisak K, Bittner E, George E, Hess D: Effects of supervision by attending anesthesiologists on complications of emergency tracheal intubation. *ANESTHESIOLOGY* 2008; 109:973-7
7. Brown DL, Warner ME, Schroeder DR, Offord KP: Effect of intraoperative anesthetic events on postoperative patient satisfaction. *Mayo Clin Proc* 1997; 72:20-5
8. Levy MM, Rapoport J, Lemeshow S, Chalfin DB, Phillips G, Danis M: Association between critical care physician management and patient mortality in the intensive care unit. *Ann Intern Med* 2008; 148:801-9
9. Redelmeier DA, Tibshirani RJ: Association between cellular-telephone calls and motor vehicle collisions. *N Engl J Med* 1997; 336:453-8