



Adequate confirmation of recovery from neuromuscular blockade: What are the obstacles?

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To the Editor,

We read with interest the article by Dr. Donati on residual paralysis¹ and the accompanying editorial.² The author effectively summarizes the rationale for documenting complete (near-complete) recovery from neuromuscular blockade and also points out that residual paralysis continues to occur frequently and likely increases perioperative complications. We don't necessarily view this as a deficiency of knowledge in the field but as a failure to implement what is known. It has been recognized for some time and published in major anesthesia texts that "normal respiratory and upper airway function does not return to normal unless the train of four ratio at the adductor pollicis is 0.9 or more".³ As Dr. Donati points out, it is also understood that the twitch should be assessed at the adductor pollicis, not at the corrugator supercilii. This failure to implement "expert knowledge" is not unique to anesthesiologists. It is well recognized that implementation of evidence-based practice can take years to disseminate both inside and outside the field of medicine.⁴ Many "expert" recommendations have been reversed, including many that affect anesthesiologists, such as perioperative blockade and tight glycemic control, and these changes of opinion likely create skepticism. In addition to the reasons cited in the editorial for failure to achieve complete reversal, including lack of knowledge, skepticism, and technical issues, we consider production pressure to be another reason why tracheal extubation is performed before the patient has achieved a train-of-four ratio (TOFR) > 0.9. In cases that require deep neuromuscular blockade during the procedure, e.g., laparoscopy, it may be very difficult with

current reversal agents to achieve complete recovery in the short period of time it takes to close the port-site wounds and wake the patient. As such, the options are 1) to prolong tracheal intubation with the patient in the recovery room; 2) to wait until the TOFR is 0.9, thereby "delaying" the next case; or 3) to perform tracheal extubation when the patient "seems ready", which is typically based on subjective measures such as tidal volume and head lift. Most anesthesiologists support use of the third option sensing that they don't see problems related to residual neuromuscular blockade in the postanesthesia care unit.⁵ The risk to the patient will likely be reduced over time through increased education and awareness as well as availability of drugs with rapid reliable reversal of paralysis. We applaud the authors for their efforts in this regard.

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Reply,

Drs Caruso and Urdaneta clearly identify two barriers associated with knowledge transfer into clinical practice, namely, deficiency of knowledge, and failure to implement what is known. Regarding residual neuromuscular blockade, they consider the knowledge base to be well established and convincing; consequently, the problem appears to be failure on the part of individual practitioners to apply that knowledge in everyday practice. Production pressure is identified as the driving force behind the lack of uniform adherence to recommendations, with the result that patients may undergo tracheal extubation with inadequate reversal of paralysis. Fortunately, most patients will cope without too much harm, with the symptoms of weakness¹ and a prolonged stay in the recovery room² recognized as minor side effects. Unfortunately, a small proportion of patients might have major adverse events, such as aspiration, hypoxia, and respiratory failure. Failure to comply with good clinical practices might be regarded as

refraining from buying insurance: in most cases, it appears profitable because nothing serious happens; however, the situation might be catastrophic if unlikely but serious events do occur.

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