Closing the Loop on Relaxant Reversal

To the Editor:

We read with interest the article by Thilen et al.,1 pertaining to residual paralysis. We commend the authors for clarifying the pitfalls of monitoring the periorbital muscles as opposed to the adductor pollicis muscle. However, we are curious as to how adequate reversal of neuromuscular blockade was assessed prior to extubation. Depending on the density of the block, complete reversal after an intermediate duration of neuromuscular blocker may be rapid, but could take up to roughly 50 min.2 Due to the variability and the danger of respiratory complications with residual paralysis, we consider it essential to document that adequate reversal has in fact occurred. As Plaud et al.3 highlight in their excellent review article, subjective assessment of train-of-four strength and measurement of tidal volume, two often mentioned parameters, are wholly inadequate to assess adequate reversal. Without quantitative train-of-four monitoring intraoperatively, 5 s head lift and sustained tetanus with 100 Hz are the best available parameters, although even these are not completely adequate. We question which measures were used in this study.

The authors state that the time interval from neostigmine administration to train-of-four ratio measurement was not significantly different between the two groups. Given the different degrees of neuromuscular blockade at the time of reversal (based on similar train-of-four at the two different sites), it is possible that the decision to extubate was based on time elapsed from neostigmine administration rather than specific measures of strength. The time pressure of getting patients extubated as well as reliance on less reliable measures such as tidal volume may explain this finding. While most patients will not be harmed (as shown in this study) by extubating with a train-of-four ratio less than 90, these patients are likely at increased risk of respiratory complications.4 As such, we encourage practitioners to confirm that the reversal drug has had the desired effect. To not do so makes an assumption which will be incorrect in a small but real percentage of patients.

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References


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In Reply:

We thank Dr. Caruso for his comments related to our observational study reporting a substantially increased risk of postoperative residual paralysis in patients having qualitative train-of-four (TOF) monitoring of eye muscles compared with those monitored at the adductor pollicis.1 Reversal of neuromuscular blockade before extubation was assessed clinically as per routine care. Due to the observational nature of the study, we did not standardize what clinical tests that may have been used. We agree with Dr. Caruso that subjective assessment of the response to nerve stimulation, and of clinical tests, is inadequate to confirm successful reversal.

Although the presumed mechanism behind the association of monitoring site and residual paralysis would be a more generous administration of neuromuscular-blocking drugs to patients with monitoring of eye muscles, we did not observe differences in neuromuscular-blocking drugs dosing. It is conceivable that patients in the eye muscle monitored group would have had lower adductor pollicis TOF-counts at the time of neostigmine administration to train-of-four ratio measurement was not significantly different between the two groups. Given the different degrees of neuromuscular blockade at the time of reversal (based on similar train-of-four at the two different sites), it is possible that the decision to extubate was based on time elapsed from neostigmine administration rather than specific measures of strength. The time pressure of getting patients extubated as well as reliance on less reliable measures such as tidal volume may explain this finding. While most patients will not be harmed (as shown in this study) by extubating with a train-of-four ratio less than 90, these patients are likely at increased risk of respiratory complications.4 As such, we encourage practitioners to confirm that the reversal drug has had the desired effect. To not do so makes an assumption which will be incorrect in a small but real percentage of patients.

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