



Neuromuscular Blockade Monitoring: Assessing Nurse Anesthetists' Perceptions of the Usefulness of and Preference for Qualitative versus Quantitative Measurements: A Quality Improvement Project

Jenn Romagnoli, BSN, SRNA

Travis Chabo, PhD, CRNA, Project Chair

Nurse Anesthesia Program
College of Nursing, East Carolina University
Greenville, North Carolina 27858
romagnolij20@students.ecu.edu

INTRODUCTION

- Inaccurate assessment of neuromuscular function during paralysis may result in residual neuromuscular blockade, which is the lingering impairment of neuromuscular function in the postoperative period.^{1,2,3}
- Despite guideline recommendations in anesthesia literature to have a train-of-four ratio ≥ 0.9 by quantitative monitoring prior to emergence, there continues to be inconsistency in applying these guidelines and understanding providers' perceptions in preference of qualitative versus quantitative monitoring.
- The purpose of this quality improvement project was to assess anesthesia providers' perceptions of the usefulness of and preference for using qualitative (peripheral nerve stimulator, PNS) versus quantitative (acceleromyography) neuromuscular blockade reversal measurements in the perioperative setting.

METHODS

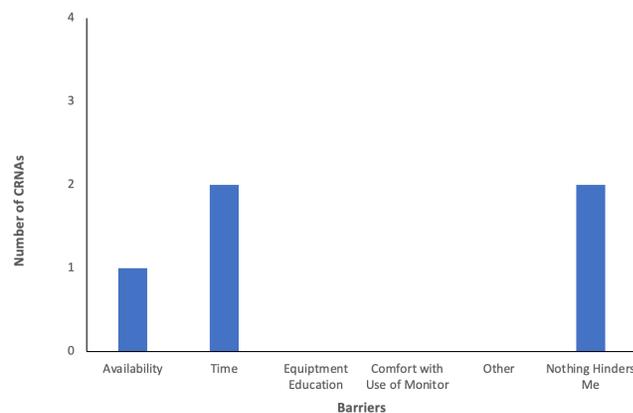
A single plan-do-study-act cycle was completed using a pre-intervention survey and post-intervention survey.⁴

- "Plan" phase: Discussion of topic with program director and designation of students to the project chair. Bimonthly in-person meetings were held to identify gaps in literature, clinical practice issues, and development of the intervention. An educational PowerPoint with voiceover recording and short instructional video were created to demonstrate the usage of the acceleromyography device.
- "Do" phase: CRNAs participating were emailed links to Qualtrics pre-intervention survey questionnaire with an education video included. CRNAs utilized quantitative neuromuscular blockade monitors for two weeks during the implementation phase.
- "Study" phase: Data was collected through Qualtrics questionnaire regarding CRNAs preferred (qualitative/quantitative) assessment practices over the two weeks. Excel was used for data analysis
- "Act" phase: Dissemination of findings to participating organization to assist with continuing cycles.

RESULTS

Figure 1

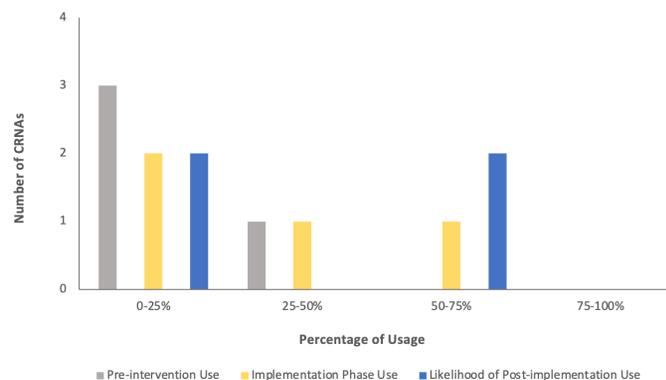
Barriers to Use of Neuromuscular Monitor Pre-intervention (n=4)



Note. Survey question was select all that apply for answer choice.

Figure 2

Comparison of Acceleromyography Use (n=4)



DISCUSSION

- All participants reported caring for a patient experiencing inadequate neuromuscular reversal in the past, with all indicating using PNS and clinical assessment (head lift, spontaneous breathing, etc.) for assessment during those occurrences.
- All participants reported their perception of the accuracy of acceleromyography as neutral pre-implementation.
- Availability and time were two reported factors contributing to low use of the acceleromyography device.
- All participants identified it took less than 4 minutes to set-up acceleromyography device and 75% of them reported it took between 1-2 minutes.
- All participants reported using the device was more time consuming than their usual methods of monitoring.

CONCLUSIONS

- Time was one of the prominent barriers to use of the acceleromyography device. This aligns with current literature.
- Post-intervention, most participants reported the device as neutral when asked about its accuracy compared to their current practices. Demonstrating providers did not find the device any more accurate than their usual methods post implementation
- Participants perceptions of accuracy findings align with what was found in the literature.
- Future studies:
 - Larger sample size for more substantial data distribution
 - Provider perceptions regarding the incidence and impact residual neuromuscular blockade can have.
 - Assessment of patient's level of neuromuscular blockade immediately after arrival at the PACU.

REFERENCES

1. Dunworth, B. A., Sandberg, W. S., Morrison, S., Lutz, C., Wanderer, J. P., & O'Donnell, J. M. (2018). Implementation of acceleromyography to increase use of quantitative neuromuscular blockade monitoring: A quality improvement project. *ASA Journal*, 58(4), 269-277.
2. Renew, J. R., Hex, K., Johnson, P., Lovett, P., & Pence, R. (2020,2021). Ease of application of various neuromuscular devices for routine monitoring. *Anesthesia and Analgesia*, 132(5), 1421-1428. <https://doi.org/10.1213/ANE.0000000000005213>
3. Saager, L., Maiese, E. M., Bash, L. D., Meyer, T. A., Mirkowicz, H., Groudfine, S., Philip, B. K., Tanaka, P., Gan, L. J., Rodriguez-Bianco, Y., Soto, R., & Heisel, O. (2015). Incidence, risk factors, and consequences of residual neuromuscular block in the United States: The prospective, observational, multicenter RECITE-US study. *Journal of Clinical Anesthesia*, 55, 33-41. <https://doi.org/10.1016/j.jclinane.2018.12.042>
4. Institute for Healthcare Improvement. (2021). *Science of Improvement: How to improve*. <http://www.ihi.org/resources/Pages/HowtoImprove/ScienceofImprovementHowtoimprove.aspx>.