Implementation of Best Practices in Neuromuscular Blockade and a Reversal Protocol

UNIVERSITY of MARYLAND SCHOOL OF NURSING

Alison Farmer, BSN, RN, CCRN, SRNA
Dr. Richard Conley, DNP, CRNA, CNE
Dr. Richard P. Dutton, MD, MBA
University of Maryland School of Nursing

Problem Statement

Despite an over six-fold increase in cost, providers consistently use Sugammadex for the reversal of Neuromuscular Blockade (NMB), despite clinical indicators it may not be necessary.

Internal Data
- Over 96% of patients were reversed with Sugammadex
- Increased Costs
  - Neostigmine with Glycopyrrolate is $18.30
  - Sugammadex: $119.23

Literature Support
- Quantitative neuromuscular monitoring better identifies postoperative residual neuromuscular blockade
- Reversal protocols decrease Sugammadex usage

Purpose Statement

Based on the literature, the purpose of this quality improvement (QI) project is to implement quantitative monitors and an NMB reversal protocol to decrease Sugammadex usage among patients undergoing laparoscopic robotic surgery.

Goals

Process Goals
- 100% compliance using the quantitative monitors and reversal protocol for all robotic laparoscopic surgeries
- 100% compliance following the reversal protocol and documenting the TOF ratio/count in the EHR

Outcome Goals
- There will be a 20% decrease in Sugammadex usage.

Methods

Setting and Population: Acute care teaching hospital and trauma center in the northeast United States. Anesthesia providers, including CRNAs performing anesthesia with one dedicated operating room for robotic surgeries.

Intervention: Quantitative neuromuscular monitors and an NMB reversal protocol based on level of blockade were implemented to address the problem of Sugammadex overutilization in robotic surgeries

Implementation Strategies: Educational PowerPoint, cognitive aid for reversal protocol, collaboration with stakeholders, use of change champions, and reminder messages.

Methods

Measures: Surveys and audit tools using Research Electronic Data Capture (REDCap) to track provider education and adherence to reversal protocol and the use of quantitative monitors

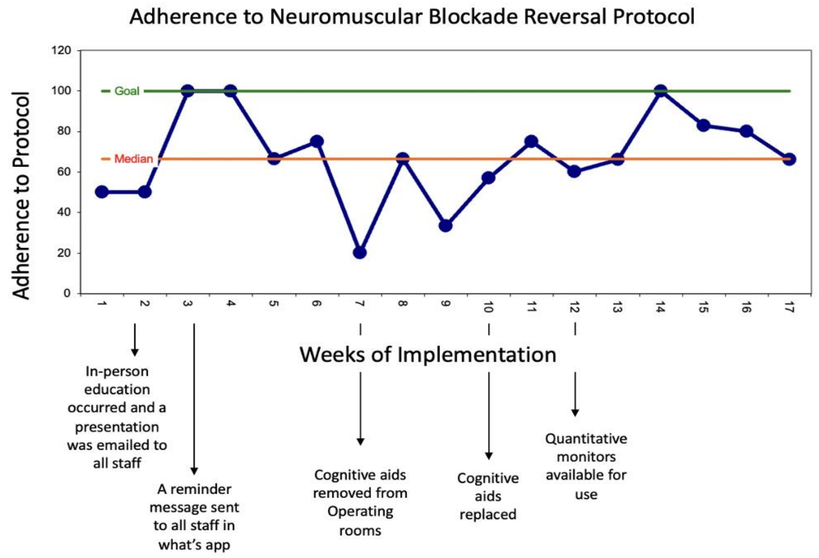
Education Survey

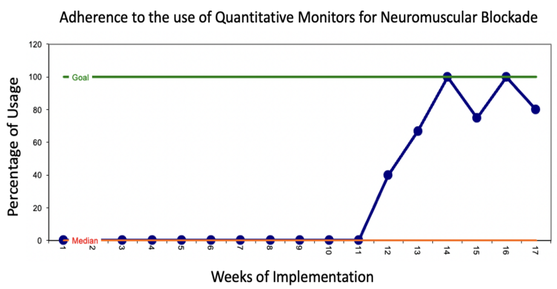
Audit Tool

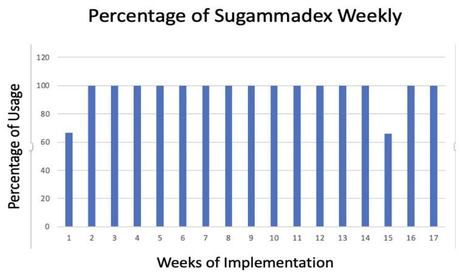
Level of Neuromuscular Blockade	Reversal Agent and Dose
TOF Ratio ≥ 90%	No Reversal
TOF Ratio 40-90%	Neostigmine 0.04-0.08 mg/kg + Glycopyrrolate 0.2 mg/ 1mg of Neostigmine
TOF Count >2 twitches but TOF Ratio < 40-%	Sugammadex 2 mg/kg
TOF Count <2 twitches or PTC	Sugammadex 4 mg/kg

Cognitive aid placed in OR for staff reference

Results







Discussion

Goal Achievement and Impact
- A reversal protocol with a **cognitive aid was created**, and **quantitative monitors** were **successfully introduced** into operating rooms.
- Following the introduction of quantitative monitors, adherence using the monitors **reached 100% for 2 weeks**; however, it did not stay consistent.
- Adherence to the **reversal protocol remained inconsistent**, with adherence increasing to 100% following education and introduction of the monitors.

Limitations
- Quantitative monitors were delayed due to approval issues
- Insufficient buy-in
- Staff not comfortable using Neostigmine with glycopyrrolate
- Cognitive Aids removed from OR

Conclusion

Summary: Sugammadex usage remained high following the implementation of this project and resulted in insignificant changes.

Contribution, Spread, Sustainability, Next Steps
- The findings suggest that a combination of education, reminders, cognitive aids, and technological support is necessary for sustained adherence
- While initial education efforts were successful, continued reinforcement through reminders and cognitive support tools is essential.
- Future strategies should focus on consistent reminders and educating staff on current NMB reversal recommendations.

Acknowledgements

Special thank you to Dr. Richard Conley, Dr. Richard Dutton, and Dr. Chintan Patel for their support and contribution to this project.

References

Please contact Alison Farmer at afarmer@umaryland.edu for any questions or concerns

References are available in the QR code