

Improving Confidence Level of Perianesthesia Nurses Using Malignant Hyperthermia Cart Hands-On Training

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Abstract

Introduction: Malignant hyperthermia (MH) is a rare inherited skeletal muscle disorder that has been reported to occur 1 in 5,000 to 100,000 anesthetics (Mullins, 2017), Malignant Hyperthermia Association of the United States (MHAUS) recommends annual education that includes not only rapid recognition of MH signs and symptoms, but the team to locate the closest MH cart and have hands-on experience to improve their confidence level and familiarity.

QI Question/Purpose of the Study: This project examines the impact of MH cart hands-on training on the confidence level of perianesthesia nurses in responding to MH crisis.

Methods: Pre and post- training assessments were sent to 63 perianesthesia nurses to determine their confidence level on a scale of 1-5, with 0 being not confident and 5 being very confident. Series of MH cart training was conducted at various days and times to allow for maximum attendance.

Outcomes/Results: The mean pre-training confidence level of 3.27 (SD=1.22) increased to 4.67 (SD=0.53) after the training (P=1.328). Several respondents verbalized value in knowing the contents of the MH cart, where they are located in the cart and their indication. 98% of them considered themselves familiar with the location of the closest MH cart after the training session. All of the respondents acknowledged that the course materials were essential for their success in responding to MH crisis.

Discussion: Post training assessment showed significant knowledge gain from the training and marked improvement in confidence levels. It is evident that the training equipped nurses with tools and understanding needed to respond to MH crisis.

Conclusion: MH cart hands-on training improved confidence level of perianesthesia nurses in responding to MH crisis.

Implications for perianesthesia nurses and future research

This provides compelling evidence that hands-on training of MH cart increases confidence level of perianesthesia nurses. Other perianesthesia units can model our method in bringing confidence level of perianesthesia nurses to optimal.

Background

Early recognition of symptoms and prompt treatment are crucial in managing a malignant hyperthermia (MH) crisis. These factors significantly impact patient outcomes and can help reduce Mortality rates (Toyota.Y. et.al.2023).

To assess the preparedness of our perianesthesia staff, a comprehensive survey was conducted. The results revealed a significant knowledge gap in the management of MH crisis, particularly in locating the MH cart and administering the appropriate dosage of Ryanodex. Additionally, staff RNs expressed concerns about their lack of confidence in managing an MH crisis and uncertainty regarding their ability to respond effectively. The current annual MH cart training does not provide sufficient preparation for them to feel fully confident in handling an MH crisis.

These findings highlight the need for targeted ongoing training programs to address these gaps. By enhancing staff awareness, improving response times, and increasing confidence in MH crisis management, we can enhance patient safety, mitigate risks associated with delayed or incorrect treatment, and ultimately improve overall care for patients at risk of malignant hyperthermia.

Discussion

The post-training assessment demonstrated a significant increase in knowledge retention, confirming the effectiveness of the training in enhancing staff understanding of malignant hyperthermia (MH) management. Additionally, there was a notable improvement in the confidence levels of the nurses, suggesting that the training not only increased theoretical knowledge but also helped build practical competencies. Hands-on training with the MH cart allowed nurses to become familiar with the equipment and gain greater confidence in the medication management of MH.

Malignant hyperthermia crisis management posters have been placed in all the break rooms for familiarization. Moving forward tips sheets will be sent out to all registered nurses in a quarterly basis and accessible via share point to bridge the gap between the annual MH education.

The authors consider offering this education more often than annually to improve the staff readiness and ensure optimal care for patients at risk of malignant hyperthermia.

Implementation

Setting: This project was implemented at a large academic medical center in the south-central region of the United States.

Implementation: The training involved an actual malignant hyperthermia cart where perianesthesia nurses were instructed to locate a given content within the cart. This was followed by a dialogue between the clinical educator and the participants to identify its relation to the management of malignant hyperthermia crisis and providing them opportunity to ask questions. Only 5-7 participants were allowed each session to foster optimal learning.

Permission to take the MH cart out of patient care area was obtained from the director of surgical services 2 days prior to a session. A communication was sent to all operating room managers, lead anesthesia technicians and designated pharmacy technician to keep stakeholders informed. On the day of the session, a note was posted on the wall where cart is located to alert staff that the cart was being used for training and that the clinical educator can be reached at the contact information listed for emergency (see appendix A).

Appendix A

MH cart in use for training in 4.682 0900-1300

Vocera call Charles Almin Alba or Joshila Muraleedharapanicker or Call Hazzel [REDACTED] for emergent need

There were total of 16 training sessions conducted. Perianesthesia nurses from both Prep-Recovery and PACU participated. Each session was administered in a classroom setting where participants were able to focus without distraction. An instructional guide was developed to help clinical educators stay on topic and provide consistent information (see Appendix B). And to avoid incurring costs, participants were advised to refrain from opening the packages.

Appendix B

MH Knowledge/Reference

Recognize signs and symptoms (2019 code)

- 1. Tachycardia
- 2. Hypertension and/or hypotension
- 3. Hyperventilation
- 4. Rhabdomyolysis
- 5. Metabolic acidosis
- 6. High anesthetic induction dose
- 7. High anesthetic maintenance dose
- 8. High anesthetic recovery dose
- 9. High anesthetic elimination dose
- 10. High anesthetic elimination dose
- 11. High anesthetic elimination dose
- 12. High anesthetic elimination dose
- 13. High anesthetic elimination dose
- 14. High anesthetic elimination dose
- 15. High anesthetic elimination dose
- 16. High anesthetic elimination dose
- 17. High anesthetic elimination dose
- 18. High anesthetic elimination dose
- 19. High anesthetic elimination dose
- 20. High anesthetic elimination dose

Locate the following:

- 1. MH cart
- 2. MH cart
- 3. MH cart
- 4. MH cart
- 5. MH cart
- 6. MH cart
- 7. MH cart
- 8. MH cart
- 9. MH cart
- 10. MH cart
- 11. MH cart
- 12. MH cart
- 13. MH cart
- 14. MH cart
- 15. MH cart
- 16. MH cart
- 17. MH cart
- 18. MH cart
- 19. MH cart
- 20. MH cart

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Data Collection: A pre-training survey and post-training survey were created specifically for the purpose of examining the confidence level of the perianesthesia nurses on a scale of 1-5, with 0 being not confident and 5 being very confident. Post-training survey included elements to evaluate levels 1 and 2 of The Kirkpatrick Model. Participants were asked to evaluate the course materials, content relevance and their own knowledge after the training session. They were also instructed to identify significant lesson they learned in the experience.

Learning Activities



Training session with PACU nurses



Training session with perianesthesia nurses in the ECT procedural area



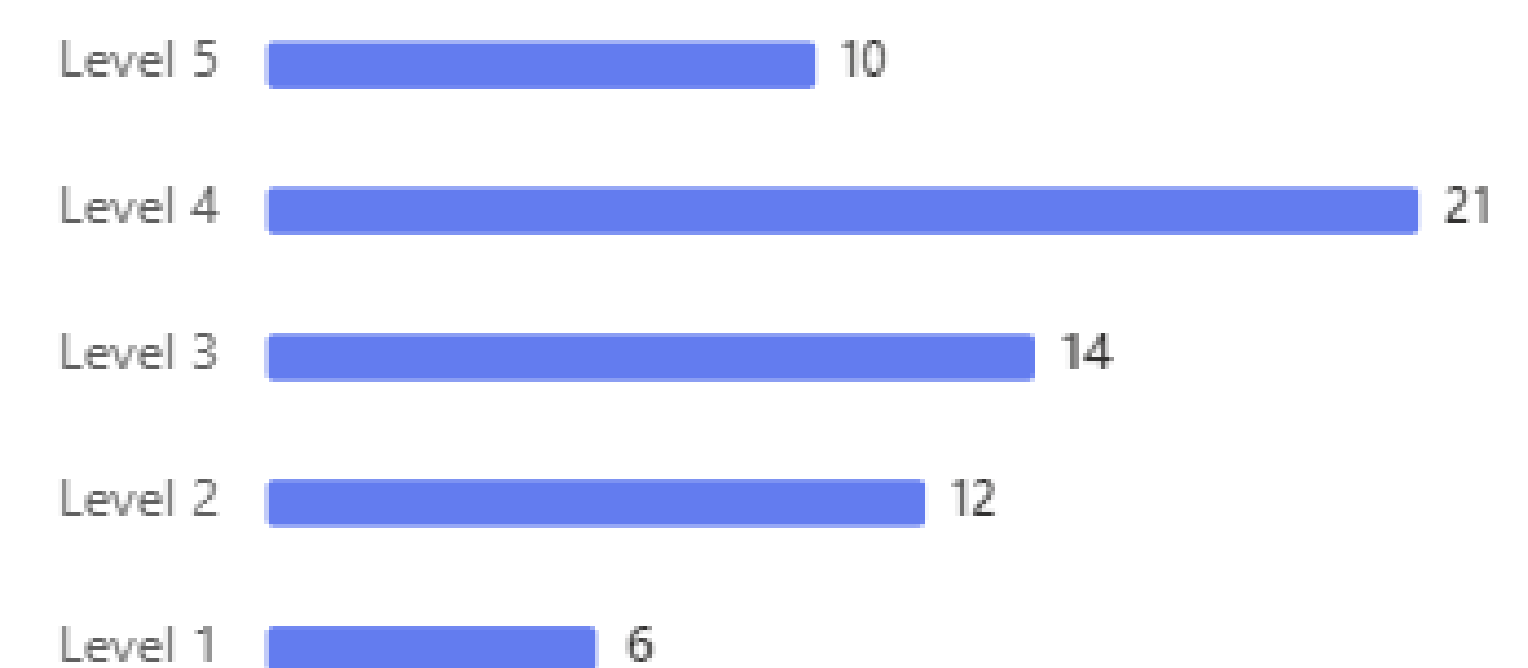
One of the 7 MH carts in the hospital

Outcomes

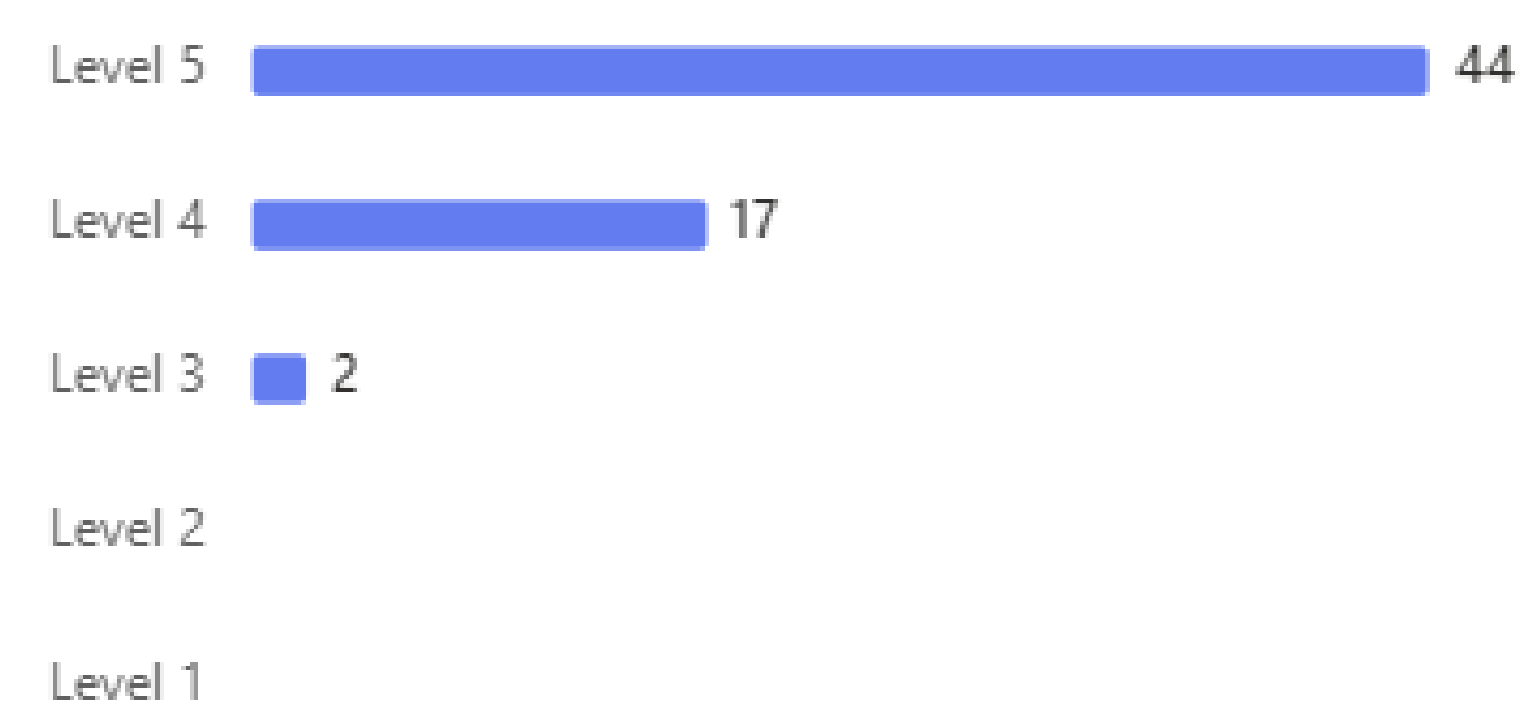
To measure the confidence level of Perianesthesia nurses using malignant hyperthermia cart hands-on training, a pre and post survey was utilized.

The mean pre-training confidence level of 3.27 (SD=1.22) increased to 4.67 (SD=0.53) after the training (P=1.328).

Pre survey:



Post survey:



References

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Toyota, Y., Kondo, T., Shorin, D., Sumii, A., Kido, K., Watanabe, T., Otsuki, S., Kanzaki, R., Miyoshi, H., Yasuda, T., Horikawa, Y.T., Mukaida, K., Tsutsumi, Y.M. (2023). Rapid Dantrolene Administration with Body Temperature Monitoring Is Associated with Decreased Mortality in Japanese Malignant Hyperthermia Events. BioMed research international, 2023.

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