Background

- Malignant Hyperthermia (MH) is potentially a fatal reaction that occurs in response when a patient is exposed to a volatile anesthetic or succinylcholine (Malignant Hyperthermia Association of the United States [MHAUS], n.d.)

- The response triggers a hypermetabolic state where prompt recognition and treatment are essential for **survival**.

- The Advocate Health standard suggests that MH responders (trained nurses/providers) should be administering Dantrolene within **10 minutes** from symptom recognition. Without a formalized educational plan and clinical workflow, patient safety is at risk.
Local Problem

• The leaders on the Rapid Response Team (RRT) at Advocate Christ Medical Center (ACMC) identified a knowledge gap in the process for treating MH patients outside high-risk areas.

• Staff in high-risk areas like L+D, Surgery, and other procedural areas receive focused MH education; however patients recover on a variety of nursing specialty units (med-surg, cardiac tele, stepdown) at ACMC.
Method

- A MH simulation was developed in response to our local problem.

The overall goals for the simulation initiative were:

- RRT nurses learn to identify risk factors and symptoms of MH.
- Improve overall knowledge and response skills for MH management.
- Improve RRT clinical workflow and create a MH treatment medication box.
Results

- To evaluate the simulation, RRT nurses completed an eight-question survey to assess their knowledge and patient management of MH at four times: pre-, immediately post, three months post, and six months post-simulation.
- There was a 9% increase in average score from pre-simulation to immediately post-simulation.

<table>
<thead>
<tr>
<th></th>
<th>Pre-Simulation</th>
<th>Post-Simulation</th>
<th>3 Months Post-Simulation</th>
<th>6 Months Post-Simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Responses</td>
<td>17</td>
<td>20</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>Average Score</td>
<td>80%</td>
<td>89%</td>
<td>95%</td>
<td>92%</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>24%</td>
<td>13%</td>
<td>8%</td>
<td>10%</td>
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</table>

Figure 1: Comparison of MH Data Sets
Figure 2: MH Knowledge Retention

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Post</th>
<th>3 Months</th>
<th>6 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>8.0</td>
<td>8.9</td>
<td>9.5</td>
<td>9.2</td>
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</tbody>
</table>

MH Knowledge Retention

Mean Scores (with Standard Error)
Comparison of Data Sets:

**Pre-Simulation** → **Post-Simulation**
- f-test: 0.02
- t-test: 0.09 (one-tailed)
  Represents homoscedastic data

**Post-Simulation** → **3 Months Post-Simulation**
- f-test: 0.04
- t-test: 0.07 (two-tailed)
  Shows a non-significant loss of MH knowledge over 3-month period

Figure 3: Pre-Simulation Knowledge Scores

Figure 4: 3 Months Post-Simulation Knowledge Scores
Implications for Practice

- A new process and workflow for obtaining the MH box was created specifically for the RRT team. This will decrease response time from recognition of symptoms to medication administration.

- RRT RNs were trained on medication administration utilizing liter bags of saline vs individual vials due to product availability.

Figure 5: RRT MH Box
RRT Discussion/Future

• Upon design of simulation there were many workflow processes that were not hardwired within the organization. Multiple opportunities were discovered for improvement including multidisciplinary collaboration, supply availability and response process.

• In debrief, the RRT team had many discussions regarding the improved processes to support patient safety. Overall, the team felt a widespread increase of confidence with responding to MH emergencies.

• RRT leaders will participate in the design of an annual ED/ICU MH simulation for our enterprise.
  • Our ACMC team will utilize the Donna Wright model for annual education.
Questions?/Open Discussion
References

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