Evaluation of Enteral Nutrition in Critically Ill Patients at LUMC Utilizing a 24-hour, Nurse Driven, Volume-Based Feeding Protocol

Team Membership:
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Background – The Problem

- There is a known association between inadequate feeding and poor clinical outcomes in critically ill patients.
- The main route of providing nourishment to critically ill patients is enteral nutrition (EN).
- Efforts to increase the enteral provision of macronutrients is warranted.
Background – The Problem

• EN is traditionally initiated at a low rate, advanced slowly, and maintained at a target maintenance rate with no protocol to compensate for loss of feeding time due to frequent interruptions (e.g., ventilator weaning, surgery, procedures, etc.)

• Holding EN can result in a form of iatrogenic malnutrition where patients are consistently receiving less than their prescribed nutritional needs
Project Aim Statement

• Determine if a 24-hour, nurse driven, volume-based EN protocol (post-study) will improve feeding adequacy compared to the current rate per hour enteral feeding practices (pre-study)
• Implemented in the LUMC medical intensive care unit (MICU) and surgical intensive care unit (SICU)
• Study executed over a three month period from January 1, 2013 to April 1, 2013
Project Goals

- Develop and implement a volume-based, nurse driven protocol for EN delivery
- Increase average percent goal volume received by post-study population to >68%
- Increase average calorie intake of post-study population to >68% of estimated daily needs
- Increase average protein intake of post-study population to >68% of estimated daily needs
Solutions Implemented

- Reinforcement and continuing education was provided to nursing staff throughout duration of study
- MICU and SICU Registered Dietitians created larger, more colorful signage to display in patient rooms to increase nursing staff awareness of patient participation in study
## Results

**Table 1: Enteral Nutrition Analysis Among LUMC Critical Care Patients Receiving Continuous Enteral Nutrition**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total (n= 52)</th>
<th>Pre (n= 29)</th>
<th>Post (n= 23)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Feeding Rate (cc/hr)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>24.03 ± 16.65</td>
<td>15 ± 6.26</td>
<td>35.43 ± 18.70</td>
<td>0.0001</td>
</tr>
<tr>
<td><strong>Average Initial 24-hr Feeding Volume (cc)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>1294.25 ± 381.61</td>
<td>1388.37 ± 78.27</td>
<td>1175.56 ± 359.28</td>
<td>0.045</td>
</tr>
<tr>
<td><strong>Hours to Feeding Rate Goal (hrs)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>21.84 ± 22.72</td>
<td>26.41 ± 19.01</td>
<td>16.08 ± 25.98</td>
<td>0.104</td>
</tr>
<tr>
<td><strong>Average Percent Goal Volume Received (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>73.75 ± 17.16</td>
<td>68.27 ± 13.03</td>
<td>80.65 ± 19.43</td>
<td>0.008</td>
</tr>
</tbody>
</table>
Results

Figure 1: Average Percent Goal Volume Received Over Total Feeding Days Per Subject (Pre-study vs. Post-study)
### Analysis of Results

#### Table 2: Average Provision Adequacy Over Total Feeding Days Among LUMC Critical Care Patients Receiving Continuous Enteral Nutrition

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total (n= 52)</th>
<th>Pre (n=29)</th>
<th>Post (n= 23)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories (%)</td>
<td>73.30 ±17.86</td>
<td>68.27 ± 13.08</td>
<td>79.64 ± 21.13</td>
<td>0.021</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protein (%)</td>
<td>73.05 ± 18.15</td>
<td>68.43 ± 13.24</td>
<td>78.87 ± 21.85</td>
<td>0.038</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td></td>
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</tbody>
</table>

- The study met the goals: average percent goal volume >68%, caloric intake of estimated needs >68%, and protein intake of estimated needs >68%
Lessons Learned

• Current practice provides ~68% of estimated caloric and protein needs
• Decreased intake has the possibility to negatively impact patient outcomes
• A new volume-based protocol may allow for greater EN intake
Next Steps

- Goal to transition from current rate per hour (mL/hr) protocol to daily overall volume-based protocol throughout LUMC
Contact Information

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*A review by Manager/AD/Medical Director/VP is recommended prior to submission.*

Reviewed By:________________________
Date__________________