Update
ICU Liberation: Executing the ABCDEF Bundle Daily

April 4, 2019
Enacting the ABCDEF Bundle

Teamwork Evidenced by Coordination of Evidence-Based Interventions:

**ABCDEF Bundle**
- A: Assess, Prevent and Manage Pain
- B: Both SAT and SBT
- C: Choice of Analgesia and Sedation
- D: Delirium: Assess, Prevent and Manage
- E: Early Mobility and Exercise
- F: Family Engagement and Empowerment

Society of Critical Care Medicine: ICU Liberation
- 69 ICUs across USA

Penn Medicine:
- 6 Hospitals
- 16 ICUs
Design

Clinical Algorithm

Patient hemodynamically stable

+ Patient meets criteria for sedation minimization and/or spontaneous breathing

Real time feedback

Text alerts to RT and RNs

Updates the ICU Board

Tracking performance

Clinical Algorithm

Patient hemodynamically stable

+ Patient meets criteria for sedation minimization and/or spontaneous breathing

Real time feedback

Text alerts to RT and RNs

Updates the ICU Board

Tracking performance
PAIN, AGITATION, AND DELIRIUM
GUIDELINE FOR MECHANICALLY VENTILATED PATIENTS

**Standard PAD Assessments**
- NRS or BPS every 4 hours and prn post pain meds
- RASS every 4 hours and more frequently as needed
- CAM-ICU every 12 hours

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**Is patient in PAIN?**
- NRS score, or BPS (set goal, usually ≤ 6)
  - **YES**
  - **NO**

**Is patient at goal RASS?**
Determine goal (usual -1 to +1)

- **NO**
  - Continue Standard PAD Assessments
    - If on cont. infusion opiate, consider transition to intermittent analgesia or no pain medication
  - Evaluate causes

- **YES**
  - **OVER-SEDATED**
    - Vent Asynchrony: Analgesia & Sedation Interruption - OR - Dose minimization to Target
  - **AGITATED**

**Fentanyl**
- Intermittent Dosing Preferred
  - 12.5-100mcg IV bolus q10-15 min to target NRS/BPS;
  - then q1-2 hours PRN
  - Max: 200 mcg q1-2 hours or dose limiting side effect

Use continuous infusion if frequent bolus dosing, hypotension from IV bolus, or max bolus achieved without control of pain
- Begin infusion at 12.5-25 mcg/hr, bolus with 50% of the hourly rate every hour PRN
- Max: 500 mcg/hour
- If appropriate consider enteral analgesics or a PCA

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**Lorazepam/Midazolam (institution specific)**
- Intermittent Dosing:
  - 1-2 mg IV bolus every 10-15 minutes to goal RASS, then bolus every 2-4hr PRN
  - Max: 6 mg every 2-4 hours or dose limiting side effect

- Continuous Infusion:
  - Use only if propofol contraindicated and hypotension from IV boluses or max IV bolus dose reached without control
  - Initiate: 0.5 mg/hour; Max rate: 10 mg/hour
    - (monitor for propylene glycol toxicity – lorazepam only)

**4**
Nursing Assessment

Confusion Assessment Method (Delirium)

Delirium Assessment q 12 hours

Richmond Agitation Sedation Score (RASS)

Sedation/Agitation Assessment q 4 hours
## Goal Setting and Performance Feedback

### ICU Board

**Awake**

<table>
<thead>
<tr>
<th>0967A</th>
<th>Sedation</th>
<th>Consider Weaning Sedation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RASS -4 [-4, -3] past 17 hours / CAM UTA</td>
<td>fentaNYL gtt 75 mcg/hr</td>
</tr>
<tr>
<td></td>
<td>DUE TO Hemodynamic instability AND High FiO2 60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>O₂ Sat ... 97 &gt; 97 &gt; 96 &gt; 96 &gt; 96 &gt; 95</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>0968A</th>
<th>Sedation</th>
<th>Consider Weaning FiO2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RASS -1 [-1, 0] past 14 hours / CAM Negative</td>
<td>Show one-time doses</td>
</tr>
<tr>
<td></td>
<td>O₂ Delivery tracheal collar</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>0969A</th>
<th>Sedation</th>
<th>SBT Ready</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RASS +2 [-3, +2] past 13 hours / CAM Positive</td>
<td>Extub screen met? No an hour ago</td>
</tr>
<tr>
<td></td>
<td>fentaNYL gtt 75 mcg/hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>dexmedetomidine gtt 0 mcg/kg/hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Show one-time doses</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>0970A</th>
<th>Sedation</th>
<th>Vented + Trached</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RASS -1 [-1, 0] past 17 hours / CAM Negative</td>
<td>fentaNYL gtt 50 mcg/hr</td>
</tr>
</tbody>
</table>

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**Breathing**

- On Vent 3d / Mode **A/C**
- TV 350 / MV 9.4 / PS 0
- Set Rate 22 / Actual 22
- FiO2 60% / PEEP 7.5

- Sedation 0967A
- Consider Weaning Sedation
- RASS -4 [-4, -3] past 17 hours / CAM UTA
- fentaNYL gtt 75 mcg/hr

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**Penn Medicine**
ABC Alert – Smartphone Text Alerts

Patient DH (FP9, 0968A) is SBT ready, but appears over-sedated. Reassess need for sedation. View patient SBT and Sedation state (UPHS wifi required):

Patient DH (FP9, 0968A) is SBT ready. View patient SBT and Sedation state (UPHS wifi required):
Sedation Minimization

Proportion of patients who received an alert and the RN minimized a continuous sedative infusion

14% overall increase in sedation minimization practice
Mechanical Ventilation

Median (days) Duration of Mechanical Ventilation Excluding H&V

0 0.5 1 1.5 2 2.5
Days

2017 Q3 2017 Q4 2018 Q1 2018 Q2 2018 Q3 2018 Q4

ICU Board Go-Live
I-LEAD introduced to UBCLs

Trachs Included
Trachs Excluded
Duration of MV

Median Duration of Mechanical Ventilation

Overall 0.4 day (10 hour) reduction in median duration of mechanical ventilation
# ICU LOS

<table>
<thead>
<tr>
<th>Unit</th>
<th>Pre: Baseline (5/17-2/18) Median ICU LOS Vented Patients</th>
<th>Post: Current (3/18-1/19) Median ICU LOS Vented Patients</th>
<th>Reduction in hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>4.8</td>
<td>4.46</td>
<td>-8</td>
</tr>
<tr>
<td>#2</td>
<td>4.8</td>
<td>4.58</td>
<td>-5</td>
</tr>
<tr>
<td>#3</td>
<td>4.7</td>
<td>3.02</td>
<td>-40</td>
</tr>
<tr>
<td>#4</td>
<td>2.3</td>
<td>2.06</td>
<td>-6</td>
</tr>
<tr>
<td>#5</td>
<td>4.8</td>
<td>4.13</td>
<td>-16</td>
</tr>
<tr>
<td>#6</td>
<td>3.6</td>
<td>3.67</td>
<td>+1.7</td>
</tr>
<tr>
<td>#7</td>
<td>3.7</td>
<td>3.13</td>
<td>-14</td>
</tr>
<tr>
<td>#8</td>
<td>3.7</td>
<td>2.42</td>
<td>-30</td>
</tr>
<tr>
<td>#9</td>
<td>3.5</td>
<td>3.17</td>
<td>-8</td>
</tr>
<tr>
<td>#10</td>
<td>3.9</td>
<td>2.75</td>
<td>-28</td>
</tr>
<tr>
<td>#11</td>
<td>2.0</td>
<td>2.27</td>
<td>+6</td>
</tr>
<tr>
<td>#12</td>
<td>2.7</td>
<td>3.67</td>
<td>+24</td>
</tr>
<tr>
<td>#13</td>
<td>3.8</td>
<td>4.96</td>
<td>+27</td>
</tr>
<tr>
<td>#14</td>
<td>3.9</td>
<td>3.57</td>
<td>-8</td>
</tr>
</tbody>
</table>
Delirium Duration

Median Duration of Delirium - All patients/All ICUs

Measure

UCL

LCL

0

0.5

1

1.5

2

2.5

3

3.5

4

4.5
“E”- Early Exercise

- Standardized daily mobility goal setting
- Performance Feedback
- Facilitator role and communication strategy
Standardized practice

Systems compliance with standardized mobility documentation

6 Month Baseline: 67%
Jan-19: 89%
Feb-19: 97%
Goal Setting and Performance Feedback

**Baseline pre-admission mobility**

**Yesterday’s peak level of activity**

**Today’s peak level of activity**

**PT/OT Consultation**